Lectures

on the

Institutes of Physic

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Delivered Anno Dom. 1767-8

Vol: II

written by

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Digestion

Animals y: live on vegitables - all we have to do then is to enquire into the Changes wch these vegitable matters undergo when received into ye Stomach - these Changes may be reduced to three Heads 1 Solution 2 Diffusion and 3rd Assimilation.

Solution is necessary to prepare the way for the Operations wch succeed it. But some matters are so heterogenous yt they cannot be dissolved, here then we must call in Diffusion. but neither of these are sufficient to acct for ye Changes wch ye Food undergoes, we

Digestion

must therefore call in Assimilation
Solution is performed by the Action of
the stomach - by its Heat - & by cer-
tain menstrua as the saliva, and
Gastric Juice and the Drinks we take in w:
are for the most part water. we shall
hereafter speak of the nature of saliva
under the head of Secretion. the Gastric
~~Liqu~~ Liquor appears to be secreted in
large quantities, & poured out into the
Stomach. to all these we may add the
mucus secreted in the Oesophagus. all
these Fluids taken together appear to
have no other Action than common
water. Agitation is necessary

Digestion

to promote this Solution in Order to suspend the Matter to be dissolved. this Agitation is occasioned chiefly by a Peristaltic motion in the stomach. every Other kind of Agitation is trifling and dont deserve our notice. Another Assistance to Solution is Heat. Some have supposed it to be a principal power. but this is false. it never exceeds 98°. such a Degree of Heat but little increases the dissolving power of water. a Degree of Heat above 98° coagulates Animal Matter, so y: it is necessary to call in a higer Degree of Heat y: we have.

Digestion

the Heat of the circumjacent viscera can add nothing to the Heat of the stomach as they never exceed it by 1 Degree. Dr. Haller imagines ye the Heat of the stomach is encreased by its Orifice being shut during Digestion, but he is mistaken for no such shutting of the Orifice of the stomach ever takes place.

many Physiologists have supposed ye Digestion is carried on by this solution only. but this cannot be, for we find many Matters are incapable of solution in the stomach.

Digestion

neither can Triture alone have any great Action. I have known Mustard seed & even soap=pills discharged without undergoing the least change. Besides we never can by any Experim.: w.th Solution or Triture form a liquor y.t has any Analogy w.th Chyle. we must therefore call in Another power to Aid for Digestion viz: Fermentation. — This power acts by extricating Fixed Air from Aliment, & thus forwards its Resolution. take Notice here I do not suppose

Digestion

fixed air to be ye Cement of solid Bodies, the Attraction of Cohesion depends upon ye joint Nature of all ye Bodies which compose it, & not upon any One of them acting as a Cement to the Rest. a difficult Problem occurs here viz: is how are ye oily & watery parts of our Aliment mixt together?. I believe they are never mixt. - the Oil appears only to be diffused, even in the Milk itself which is formed from the Chyle. Some suppose the Saliva & Bile to be of a Saponaceous Nature

Digestion

Eq: they mix the Oil & water of our Aliment, but I deny these Fluids to be possessed of any kind of Saponaceous qualities, & I think we ought to guard Eq: these words in y Animal Oeconomy.

In w: Manner are our Alimentary matters assimilated? — By Fermentation. This we prove 1st from all our Aliment being capable of Fermentation, & necessarily undergoing it 2nd from the Phenomena of Digestion, such as Fermescence & Lytication of Air 3rd from the heat of the Stomach &

Digestion

the Air taken in. how far does this Fermentation extend? - to the Acetous State. ~~this~~ does the vinous State precede it? - we know this kind of Fermentation tends to extricate Mephitic Air, which we find is always extricated from our Aliment under the name of Mephitic Air. Is this Vinous Fermentation always necessarily previous to ye Acetous? - This I cannot determine altho it appears probable i^t from its being the common Course of fermenting Bodies.

2nd from a Fact that proceeding ye Acetous Ferm^n

(a) See Dr. Ramsay's Experiments

(b) the Mephitic Air exhaled from the Lungs may arise 1st from a Fermentation or incipient Putrefaction going on in the Blood, or 2d from a Mixture of the Chyle & Blood together.

Digestion

Dr. Haller mentions many Authors w^ch: I have not been able to read who all declare they have found an Acid in ye Stomach. all Patients when they throw up the Contents of their Stomachs, show the marks of an Acid in it. This Acid is destroyed by mixing w^th: the Bile by w^ch: means the Bitterness of the Bile as well as the Acidity of the Aliment is obtunded, & from this is formed that bland Liquor we call Chyle. This is absorbed into the Lacteals. But how? Is it by Capillary, or Elective Attraction? - Dies docent - Every Conjecture that has been formed, concerning the further Changes of y^e Chyle is vague and uncertain. &c &c

Assimilation

How long does the Chyle continue be=
=fore it becomes Blood? — Some suppose
12 hours. this they infer from the White
Colour on Blood drawn from y^e Arm.
— But this White Colour depends upon
the Seperation of the coagulable Lymph
& has no Connection wth the Chyle. for
my part I cannot imagine y^e Chyle
is ever found in the Aortic System ex=
=cept in the Case of Secretion in the
Mamma. It is probable the Sangui=
=fication is not perfected in the Lungs,
but I doubt whether Chyle even
appears after it has circulated
once thro the Lungs.

Blood

This Fluid appears to be a homogeneous mass, but Experiments teach us that it is a very Heterogeneous mass.

— Blood when drawn emits a sensible vapour & the w: that looses a sensible portion of its weight. this portion differs according to the Degree of Heat, or the Quantity of Blood exposed. when the Blood coagulates it forms a Gelatinous mass, & after a while seperates into 2 parts. the One a solid red part, the Other a fluid colourless part or sometimes a little yellow. the 1: is called Cruor, or Crassimentum. the 2nd Serum. —

Blood

The Crassimentum is again divided into 2 parts. 1st: red Globules, 2nd: a white tough Gelatinous part called the Buff: Coat &c wch has long been supposed to be a morbid affection in the Blood. but it is constant & present, & may be demonstrated by pouring water on some Blood laid on a Cloath by wch means all the red parts of the Blood will be washed away, & the supposed morbid size Coat appears. Senac calls this part of the Blood coagulable Lymph. I shall distinguish it only by ye name of Lymph. the serum

Blood

appears to be Homogeneous, but Experiments teach us it is not. if we expose it to a certain Degree of Heat it coagulates like Lymph. & exhales a very volatile matter which exactly resembles the Halitus we before spoke off. —

The Parts then y^t compose the Blood are 3. Red Globules — Lymph — & Serum, or 4th: I chuse to call Ch-ter M^ons Sensac Serosity. I will not call these the Constituent parts of the Blood. Other matters may be occa-sionally there. By what means is the Blood kept Diffused? By

Blood

Heat, hence we find the Seperation we before spoke off never takes place in a Degree of Heat equal to y: of ye animal Body. The Halitus too, which exhales when the Blood is drawn, may tend to keep the Blood in a more diffused homogeneous state. The Circumstances of Drawing Blood likewise considerably influences its appearance. The larger the stream, & deeper the bleed, the quicker the Seperation & vice versa. This Experiment holds equally the same in all Inflam: Diseases. From all this you see how little Dependance is to be placed on the Appearance of the Blood in enquiring into the

state of the Fluids. formerly the only attention was paid to the Blood, in Diseases, but from w: you have heard, you are I dare say fully convinced, how very fallacious such Observations must be.

The Red Globules are not mixed w: the Lymph, but diffused only, hence the Readiness they show to seperate when Heat & Moisture are withdrawn.

The Coagulable Lymph sometimes seperates from the Serum & red Globules even in the Body when their Union is less firm than it should be, or when a sufficient Degree

of Heat to keep them united, is wanting or when a Substance is applied to it to which it has a stronger Attraction than to the red Globules. hence we find if an Artery is deprived of its Pulsation the Lymph is more strongly attracted by its, & thus constitutes Polypus.

— the Spontaneous stopping of Hæmorrhages depends upon ye same Cause. viz: the Lymph coagulating & forming a Thrombus round the Bleeding Artery.

The Serosity is of great Fluidity. — is very volatile, & by its greater Exper Escape favours the Conversion

of what is left behind. hence the quantity of Crassimentum obtained in bleeding will depend upon those circumstances wch influence the Seperation of the Serosity, such as Heat, broad vessels &c.

The Seperation of the Lymph likewise depends upon several Circumstances such as the Stream - the Degree of Heat - the Agitation it undergoes - the Form of the vessel inwch it falls - together wth the Matter of wch the vessel is made. the Seperation is easiest and quickest in Earthen vessels. even in those Cases where the Lymph is dense, & formed into a little hollow

of the Blood

floating Island, & where it spreads over the whole vessel & is less dense it depends entirely upon the Circumstances of drawing - Cooling &c we before spoke off. - I have seen both these Appearances of the Blood within these fewe weeks in a Rheumatic patient whose Blood I was sure could not be changed as it was drawn at such short Intervals.

We shall now speak more particularly of each Constituent part of ye Blood.

1 The Red Globules were supposed by Lowenhoek to consist of Clifen Globules on wch their Colour he imagind

depended. This Notion is so erroneous
y: I need not take any time to refute
it. The 1st Question y: occurs here is
Why do these Globules continue Sepa=
=rate? Why because they are not
miscible w: any other parts of the Blood.
- thus we find Alkohol & Caustic Alkali
will never mix tho' agitated ever so
long. some suppose the Reason
why the Red Globules do not mix w:
the other parts of the Blood is because they
are of an oily Nature. But surely
no Oil can prevent the Union of
the Alkali & Alkohol we before spoke
of. to me they appear to be of an

aqueous nature. this I infer from their being so easily washed away from the Lymph by water, & from ~~their~~ their being so diffusable in water. was it Oil we can these Phanomena wd: never take place. Nor do ~~it~~ their Inflamable Nature, nor yet their dissolving when put over the fire prove them to be Oil, many things yt: contain no Oil burn notwithstanding very readily & are easily dissolved by Fire. See 3478 & two following paragraphs of Dr Gaubius Pathology upon this Subject. What is ye Specific Gravity of the red Globules?

of the Blood

— I know of no Experiments that ascer=
=tain this, as Other parts of the Blood are
so diffused with them. An w: does their
Colour depend? — this is as yet un=
=known to us. Dr Senac imagines
y Colour depends upon 2 or 3 Globules
being laid together each of wch are coulour=
=less when separate. But here he af=
=sumes y: the Red Globules are len=
=ticular wch we cannot admit. I grant
indeed the greater or lesser Colour of
the Blood depends upon y Degree of
Concretion in the red Globules. hence

of the Blood

we find the Bottom of a Bason of Blood has the deepest blackish Colour which is owing to the Globules coneretting more closely. this was formerly Attributed to its not being in Contact w: the Air, but we are now sure this is not ye Case. The Difference of Colour then in the Blood depends entirely upon the greater or lesser Seperation of Serum from it. The Difference of Colour in the Arteries & veins depends upon the same Cause. the Blood in the Arteries is more agitated & hence its more florid Colour,

of the Blood

While the venous Blood is less agitated & is moreover deprived of much of its thin serous parts, & hence arises its deeper black Colour. This difference of Colour has likewise been attributed to the Action of the air on the Blood, but I think the Solution we have given of it accounts for this difference of Colour much better. But again, we know that Neutral Salts w.th thin & dissolve the Blood encrease the florid Colour, while Mineral Acids coagulate it & press out the serous parts of the Blood, & thus give it the deep black Colour. even

the vegitable Acid has these coagulating Effects altho' many suppose it tends rather to dissolve the Blood. thus far we admit Mr Senac's Opinion, but we can not admit that diffusing the Blood deprives it of its Colour. Dr Haller deserved to be consulted on this Subject. — I wish I could inform you from whence this red Colour is derived, & in w: manner these Globules are formed. they are gene=rally proportioned to the Action of the vascular System. in w: manner do they pass away? this we cannot tell. we are sure in a healthy Body

of the Blood

they do not pass away in their natural state. they appear to be more disposed to Putrefaction than any other parts of the Blood, & when putrefied they may mix with the Serum, and thus pass out of the System? but all this is only conjectural. What is their Use in the Body? perhaps to keep the Lymph diffused which we know is very much disposed to concrete. they may likewise assist in Secretion in retaining the less fluid parts of the Blood. further the Growth & Elongation of the System may

depend upon their action especially as we find them confined only to the Blood vessels.

2.nd Coagulable Lymph. It is not easy to take this portion of our Fluids by itself. it generally contains a quantity of Serum. hence our Experiments upon it must be uncertain. however we have a Fluid analagous to it on ch w: many Experiments have been made by: the Albumen Ovi. ~~[illegible]~~ both these Fluids are coagulable by 150: of Heat - both by Acids & Alkalies in like Quantities & in like Manner. they

of the Blood

only differ in 1st: the Albumen Ovi is more bland than the Lymph which: is owing to the latter containing some saline parts of the Serum. 2nd: the Albumen Ovi never concretes in the Cold which: is owing to its containing a greater quantity of Water mixed with it — if Albumen ovi is dried & afterwards mixed with: Water in the Heat of the Body it is diffused, but in the Cold it concretes like coagulable Lymph. upon the whole then I think they are exactly the same. they are both of them the Source of Nourishment. all Vegitable

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Of the Blood

matter are first formed into Lymph, wch after a while is dissolved in the water we take into our Bodies, & is then called 3rd: Serosity. This appears to be nothing but water wth: Salt dissolved in it. This Salt wch: it contains is of ye Ammoniacal kind, the Alkali of wch: is ye same wth: all other Volatile Alkalies, but its Acid is of a peculiar nature, and has been called the Acid of Urine, or the Acid of Phosphorus. But how is this Acid formed? & what is its use in ye Animal Oeconomy? ~~& Is~~ does it arise from a Degeneracy of our Blood?

of the Blood

all these are Questions we cannot pre-
-tend to answer. I am apt to think
it is not a morbid Phenomenon. I
imagin it may tend to dissolve the
Lymph so as to form the Serosity, as
also to keep the whole Mass of Blood in
a fluid dissolved State.

One Question arises here & that is
w^h: is the Proportion w^ch: each of these
parts of the Blood bear to One Another?
- many have attempted to explain
this Questions but I think w^th: little
Success. It differs in different Constitu-
-ons & in different States of the Body. It

is moreover very difficult to procure each of them in a seperate state so apt are they to be diffused w:th each Other.

The Red Globules appear to be in y:e Smallest proportion. I know of no Experiments that ascertain the proportion of y:e Lymph & Serosity. the Lymph is in a large Proportion w:th Regard to the Red Globules. it would be of little Consequence to us if we knew their Relative Proportions to each Other, as we could not tell when this Proportion was destroyed in Diseases.

What Other Matters are contained in the Blood? some suppose the

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of the Blood

Chyle ought to be considered as a part of the Blood. But the Evidences of ye Presence of this Chyle in the Blood are not satisfactory. The Notion of its prevailing in the Blood arose entirely from an Ignorance of the Nature of the Blood. Coagulable Lymph has I believe been mistook for it. I will still however allow that Chyle may be present in our Blood altho' it is not observed by our Lenses. but of this we shall speak more hereafter when we treat on ye Milk.

Our Fluids wch circulate in the Blood: vessels may be divided in 5. parts

1st Aliment not quite assimilated

2 Albumen, or coagulable Lymph.

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of the Blood

3 Albumen tending towards Serosity.
4 Serosity, strictly so called.
5 Red Globules.

To these 5 parts Dr. Lenac adds 2 more. viz a Gelatinous & Mucous Part. But I know of no Experiments that show us any thing like a Gelatinous Matter in the Blood. I therefore conclude he infers its Existence only from Theory, viz: from the Nature of the Solids wch are gelatinous when resolved, & wch are formed from the Blood. Besides even the Gelatinous Matter of our Solids is procured only by a Decomposition of their constituent parts, & does

not appear to have pricaisted in the Solids. There appears to be more Foundation for the Mucosity he talks of, especially when we see how Mucus it abounds in our System, - But notwithstanding we have no Experiments that prove its Existence in the Blood. It appears to be the product entirely of Secretion. Dr Haller endeavours to support this Opinion by saying that we take a large Quantity of Mucus in w: our the Aliment. but this proves nothing. for it must certainly undergo the common Assimilation of all Other Aliment. Dr. Senac makes use of Another Argument to confirm his Supposition. That is,

of the Blood

If you press the Stomach of a dead Animal you may squeeze out more Juices from it y^n can be supposed to be contained in its Follicles. But 2 Objections may be made ag^st this. 1st we cannot pretend to ascertain the exact Size or Capacity of the Follicles of the Stomach & 2nd supposing it pressed out in ever so great a quantity it never could have existed in ye state in the Blood, for all Secreted Matters are remarkably thin when first poured into their secretal Glands, & have scarce any Resemblance to ye Form in wch they appear after stagnating a while.

But What shall we say to the

Presence of Oil in the Blood? we certainly take a great deal of it into our Aliment, & know of nothing in the Fluids of our Body that ~~can~~ is capable of mixing it with the Blood. But still we have no proofs of its existing formally in the Mass of Blood. the Facts Dr Haller adduces in Support of this Opinion are very few & not well attested. for my part I have never seen any thing in the Blood y^t had the least Resemblance to oily Matter. — I grant there is a variety of saline Matters present occasionally in the Blood from medicines & other things taken into the Body. these saline

matters are ordinarily dissolved in ye Serum, but wth the Specific nature of these facts is no Experiments have yet determined.

One more Question occurs here, & that is, does our Blood contain Air? — Air we know enters into ye Composition of all Bodies, and is then said to be in a fixt state. But our Enquiry here is whether Air is present in an Elastic state in our Fluids, or in an intermediate state between a fixed & Elastic state? — I think we have Reason to presume it is often present in

of the Blood

in an Elastic state, but always in a half fixed state. Water contains Air in a semi-Elastic state. This we prove from taking off the pressure of the Atmosphere in an Air pump. Now Imagine it is present in the same Degree in Animal Fluids. This is proved from the Air extricated from them by Putrefaction. It is taken in by our Aliment in great Quantities in a fixed state. We cannot tell in w^h: Manner the Air escapes from the Fluids. May it not be from ye Lungs? — the Air in the Chyle is ye most Elastic.

of the Blood.

It becomes less so in the Blood, but loses all its Elasticity in some of the Secreted Fluids more especially in the Urine. This would make us believe that ~~the~~ the Air was losing its Elasticity in the Blood. But we find it in an Elastic state in the Milk - Bile - and Saliva which may seem to favour its being rendered Elastic by the System. Upon the Whole, the Subject is dark, & as yet we can say nothing precise upon it. There is One part of the Body wch seems to contain Air in an Elastic state necessarily, viz the Cellular Membrane. this is proved

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from Emphysema's. Mr. Senac says air is to be found in every Cellular Membrane in the Body. I think it appears to be highly + probable that there is a Secretion of this Air from the Fluids w.ch is poured out in the Cellular Membrane, & that many Diseases not yet described may arise from a Seperation or a want of a due Secretion of Air. this then finishes our Acc.t of the Blood, or circulating Fluids. all the other Fluids of y.e Body are formed from them by Organs provided for that purpose. this function

is called Secretion which appears to be the most considerable Function of the Animal Oeconomy, and I am sorry to add One that we understand least about. By Secretion we understand Fluids prepared from a Heterogeneous mass of Fluids by a kind of Colation. — a Question Occurs here in the first place Viz. did the secreted Fluid preexist before in the Blood? or are they formed by a new Mixture? as to the first of these we have sufficiently rejected it when considering the constituent parts of the Blood. thus far we may allow it to be true, that the

Fluids we exhale from every external & internal part of the Body, together wth the Urine & Sweat appear to be pure Serosity. we have several Exp^ts which establish this Relation. These Fluids then strictly speaking are said to be secreted, that is they pass off thro' vessels wch refuse a passage to other parts of the Blood. But no other secreted Fluids of the Body have anything that resemble them in the Blood. no One can have any suspicion of the Presence of Bile in the Blood or of the Cerumen Aureum before they are secreted. - Some suppose it secreted

Fluids exist in the Blood in those parts wch constitute them ~~these~~ ~~the~~ ~~Bile~~ by Mixture when they arrived at the Glands. thus Dr Boerhaave makes the Bile to consist of Oil - Alkaline Salts &c Absorbed from ye Omentum & Fauces. But this is contradicted by many Facts. upon the whole then conclude there is no Foundation for ye Opinion of Secreted Fluids preexisting in the Blood. We must then look ~~for~~ to the Organization of the Glands to acct for Secretion. We must reduce our Fluids to 2 kinds i Oily & 2 watery. The watery parts of our Fluids may

(a) This is remarkable in ye Blood in an Ischuria Renalis, in wch Disease even ye pores have poured out Urine.

Secretion

be divided into 1st Lymph 2nd Mucus
3rd such as are impregnated wth Saline
matter viz: Urine (a) & Perspiration.
the Oily matter are more difficultly divided
— perhaps the Milk may arise from it.
— But I cannot conceive of Bile or of
Ceramen Aurium arising from it.
we must then resolve their formation
to the Nature of the Secreting Organs.
we have no Observations y^t show us the
Presence of Bile in the Blood in an
Obstruction of the Secretion from
Schirrosity or Inflamation. we
must then allow that it is formed
in ye secretory Organ itself. we see

Secretion

something analagous to this in Plants
w^h: from one general Fluid are capable
of secreting 4 or 5 different Juices. W^h:
is the nature of the secretory Organs
y^t: gives them the power of forming
such Fluids? - this is a most difficult
Question. Some of the Glands consist of
a Series of decreasing tubes. Others have
Follicles interposed between ye secretory
& excretory vessels. But we must attend
to the first structure only in accounting
for Secretion, for the Fluids are always
secreted before they are poured into
the Follicles. Shall we call in y^e
Difference of Aperture ~~to Bus~~ indure-
-tory

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Secretion

besides to account for Secretion. hence the Reason why the Secretions in Children are different from what they are when they grow up. But 2d we find the Secretions altered by Affections of the Nervous System which tend either to contract or enlarge the Apertures of the Glands. This is evident in the limpid pale Urine which follows a Spasm on the Kidneys in an Hysteria. 3d we find the Secretion changed by encreasing the Impetus of the Blood wholly proper Matter has thro some Glands than ordinarily do, the Red Globules &c. furnishes a strong Argument in favour of Secretion depending on the Difference of Apertures

Secretion

Lr: we find in Cases of Injections the
wax is often injected without the
red Tincture wch shows us a kind of
Secretion. But all these Arguments pro=
ceed upon a Supposition of ye secretory
Fluids preexisting in the Blood. Physiolo=
gists have therefore called in Other Hypo=
thesis. Winslow supposes yt the
secretory Vessels are originally endowed
wth a power of admitting one sort of
Fluids & repelling Others, but this is
overthrown by wch we see in ye Case
of Bile wch when diffused in ye Blood
passes thro ye Kidney, Salivary Glands &c.
— Some Other powers of Mixture &

Secretion

Fermentation must be called in to aid for Secretion as well as the mere Structure of the Glands, especially in those Cases where Follicles take place. Altho we have no Instances of Fermentation in ye healthy Body yet we have in the diseased. Pus appears to be formed from Serum secreted from the Blood wh. is afterwards changed by a Fermentation sui Generis. — See Mr Gaber's Experiments.

# of Nutrition.

This subject comprehends whatever relates to the Support of the Matter of the Body. It may be divided into 2 parts 1st the Support of the fluid parts & 2 into the support of the solid parts of the Body. The 1st depends upon Aliment being taken in to the Body & converted into nourishment in the manner we have before described when speaking of the Chylopoeis & Hæmapoeis. I shall therefore only speak of the nourishment of the Solids. we shall 1st enquire what part of the Fluids are applied to

Nutrition

Nourish the Solids, & in what manner.
– this Inquiry again divides itself
into 2 parts 1st how Growth is promo-
ted & 2nd how a waste of the solid parts
is repaired after the Growth has ceased.
– I shall begin with the 1st Question in wh.
manner the Fluids are applied so as
to give Growth to the Body. you see how
much this Question is connected with the
Organization of all Animal & Vegetable
Bodies in general. But as this Subject
admits of no Application in Physic I
shall pass over it. I only observe that
I adopt the Doctrine of Stamina wh.

Nutrition

appears evident from the Body in its Growth showing marks of an Evolution of parts previously delineated. altho the Stamina of some parts of the Body did not preexist such as the hairs yet such a Nature is originally given to the parts contiguous to these parts ye did not preexist as to determine precisely the Form of all Matter applied to it. see this subject more fully discussed by Dr. Haller.

I shall consider Nutrition in the following manner.

1st w: is the proper Nutritious Fluid.

2nd: Where this Fluid is seperated from the Blood?

3rd: In w: manner is it thus seperated & how conveyed to ye smallest Fibres everywhere

Nutrition

Qu. 4th How the fluid which nourishes is applied so as to give Extension & Growth. The subject is dark, & all we can pretend to is, to offer some probable Conjectures on it.

1st Which is the proper Nutritious fluid? — I have said before that this is the Coagulable Lymph. This I infer from its Resemblance to the Albumen Ovi which we know is the only nourishment of the Chick. It is always present & in great Quantities in the System. it is originally formed from our Aliment which shows its great use, & absolutely necessary presence in the body.

Nutrition

- But I infer its being the nutritious Fluid chiefly from its Resemblance to the Albumen Ovi w: differs from it only in being a little more Fluid w: may have been the work of Secretion in the Vessels of the Hen. From this it appears that Nutrition is not performed in the larger Vessels, nor have we any Reason to suppose a secretory Apparatus is provided at the Extremities of the Arteries to give the System a proper Degree of Fluidity. Some Apparatus I grant is necessary to change the Lymph into Albumen or proper Nutritious Matter. This many Physiologists

Nutrition

have supposed is performed in the cortical part of the Brain, & hence they have supposed the nerves to be the Excretories of this nutritious Fluid when secreted, to all parts of the Body. see this enunciated more fully in Dr Boerhaave's Institutes §440-446.

– This Doctrine has prevailed for near 150 years in the Schools of Physic. Dr Haller is the first Who has opposed it, we shall briefly retail his Objection to it, as I am inclined to embrace Dr: Boerhaave's Opinion.

– my 1st Argument in Support of Dr Boerhaave's Opinion is 1st: the Brain is a Gland & 2d: the nerves are its excretories.

(2) The first thing observed in an Embrio by a Microscope is the Brain & medullary Fibres.

Nutrition

— the structure of the Brain is evidently a Gland of the Ruegelian structure. but I shall rest my Opinion upon other more substantial proofs. 2nd Dr: Boerhaave has proved y: an Inelastic Fluid is secreted in the Brain, now we before proved it could not be designed for Sense and Motion. it must then be designed to nourish the Body. 3rd the Nerves are the original Stamina of an Animal Body & all Nurishment is applied to them Stamina, from wch: it follows 2d: y: the Brain & Nerves are necessarily employed in Nutrition. 4th every part of the Body appears to have been either Fibrous

1a1 Dr Haller tells us y: upon macerating the brains they appeared to be cellular but he forgets y: maceration may have destroyed their Septums. Dr Haller himself confesses y: the Bones are formed from fibrous Stamina. this is to wonder that it may be seen in y Cranium — if it ever disappears it is owing to matter being effused w: obliterate the fibrous structure: the Pericr

or Cellular originally. the Cellular parts appear to be formed by an After Accretion. this is sometimes evi-dent to our Eyes. & is proved from the Phenomena of many Diseases. It is always in a determined Quantity in all Animals of the same Species: this only can depend upon Laminal Fibres directing its Arrangement. But what shall we say to the brains? they have sometimes no Fibres but are cellular (as) but negative proofs avail nothing. we find a Fibrous Structure in the Dura Mater which is capa-ble of forming 277 a Cellular Appearance from which it appears highly probable that the brains are Originally Fibrous.

we know were once Muscular, & were possessed of Sensibility & Irritability but by age lose them both together with their fibrous appearance, yet surely no Man will deny their being originally fibrous.

Nutrition

This answers the first & 2nd questions we proposed & in some measure the 3d: for if it is secreted in the Brain it is highly probable it is conveyed to all parts of the Body by the nerves. But I go on w: the Arguments I began with. 5th The only Fibrous parts of the Body we observe are the nerves. no Am I think has denied their fibrous structure. they all terminate in muscles w: ch I formerly said were always Fibrous. Dr Haller supposes that the Growth & Extension of the Body together w: th the Evolution of the Fœtus depends upon y e Action of the Heart & Arteries. But the

Action of a Brain & a Nervous System is Absolutely necessary to account for the first Action of the Heart & Arteries. — There are late Observations by one Mr Lione w: show us that the Animals are originally in a Vegitable State. & first thing we evolves the Germen of Plants is Heat, & we can not conceive of the Operation of Heat first on a Nervous System. The Nourishment of Vegitables depends on a Nervous System they contain of Fibres distributed in an Analagous Manner to the Distribution of Nerves in an Animal Body. It is no matter here whether the

(a) By Injection here we are to un=
=derstand coulourd Liquors so placed
on the Roots of Plants that they Ab=
=bid them.

Nutrition

Fibres are tubular or spongy. this does not affect our Question. The Fibres do not ramifie, but proceed in strait Lines like nerves. they have lately been injected by colour Liquor which always appeared in distinct seperate Lines (a) when they appear to ramifie they only split into lesser Fasiculi. Moreover by maceration they always seperate into distinct Fibres. upon the whole no Observation shows us any Analogy between the nerves of plants and the vessels of Animals. we have

no Observations that tend to show any Analogy between the Blood Vessels of Animals & the Vessels of Plants.

All Plants Spring from Original Stamina which may be seen by opening a Germen more especially their Leaves. But I return to apply this to our present subject. Every Year there are Layers accreted to the Tree from the internal Surface of the Bark. This is proved by cutting a piece of Bark out of a Tree & putting a piece of tin plate on it, & then shutting the Bark over it again, & tying it closely to the Tree. if we examine this tin plate some Years

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Afterwards we shall find it sunk pretty deep into ye Substance of the Tree.

If we examine the internal structure of the Bark of Trees we always find it Fibrous. all the Cordage used in Ship Building is procured from this part of Vegitables. Every Year the Tree receives a Layer of Fibres from the Bark which may be seen in the Spring of the Year. I grant there may be a great succession of cellular Substance to the Trees as in the Fruit, but this arises from Original Stamina.

from all this I conclude the Form & Growth of Plants depends entirely

Nutrition

upon a fibrous structure. the use I make of this very beautiful analogy is to prove that the nourishment of Animal bodies likewise depends upon Nervous Fibres. I do not pretend to say whether these nervous Fibres are hollow Tubes. we have no proof of the Tubes of plants are hollow, but on the contrary that they are of a spongy structure. If these Fibres then transmit nourishment to plants, may we not infer the nerves convey nourishment in a like manner. even supposing the vessels of plants are tubular

Nutrition

yet we know of no power capable of moving Fluids in them. Capillary Attraction acts as well in a Spongy Fibre as in a hollow Tube. the Fibres of Plants have a subtile Fluid in them: which we know from their being possessed of Irritability in Consequence of the Action of external Bodies on them. I choose to call it Irritability to distinguish it from Sensibility which more properly belongs to Animals. Electricity we see promotes the Growth of plants almost to the Eye. Light which shows us the presence of some fine Ether in them. So that

you see Plants are possessed of a Nervous System on w.h their Nutrition & Growth depend. and if this is the Case in plants we may venture very confidently to say something Analogous must take place in Animals.

However plausible this Theory may appear Dr. Haller has raised Objections to it in the 8th Chapter of his 10th Book.

"I do not argue from Sense & Motion's ceasing in Paralytic Diseases. the shrinking arises from a Diminution of the Fluids. we have no proofs of y.e Solids being lessened in Consequence of a Paly. Nutrition appears to go on as

well as con. the Shrinking of the Limb affected w: Paralysis is easily re=
=moved by restoring their Fluids to them.
— so that Dr. Haller need not have been at the pains of refuting this Argument.
2nd Dr. supposes the Fexility of ye bones is so great that the Nourishment passing thro them w: be too fluid to convey the Nourishment of the Bones.
but this is no Objection. it may carry solid matter wch it w: it deposites any: solids. the Liquor wch: forms ye shell of Snails is exuded thro its Body when it preexists in a fluid state:
— Silk — & a spider's web were originally very fluid, but become hardned. by

Exposure to the Air. the Shell of an Egg every Body will confess was one fluid, but how hard does it become when exposed to the Air! In ye same manner there is an Obscure Matter in our Nourishment. the liquidity then of the nourishing Fluid is no Objection to its passing thro' the Nerves. nor are the Nerves too small to admit of this Nourishment for I do not maintain that it is the Medium of Sense or Motion. on the contrary I maintain that these both depend on a Subtile Elastic Ether wch is peculiar to the Nerves.

3d: He says there are many animals wch: live & grow that have no nerves, & that there are some parts of the body wch: have no nerves & yet are nourished. But this is no Objection the 1st is evidently false, & wherever we see animal matter without nerves we must consider it as cellular substance effused and acreating to fibres.

4th: He says the greatest viscera have least nerves as the Liver Lungs &c. But he mistakes their Bulk by including their Fluids to wch: they owe their Size. For my part I think the

solid matter is exactly proportioned to their Nerves, in ye same manner as the parts of the Body

5: He says there are Cases of Atrophy without a Loss of Sensation. This may easily be accounted for from w: we said before. The Other of the Nerves may continue to transmit Sensations after the passage of the Nourishment thro them is Obstructed.

This finishes our Ans: to Dr Hall's Objections. I do not think them of any Force, nor am I induced by them to desert my Opinion, but on the contrary am more confirmed in it.

3rd: In what manner is this nou-
-rishment thus separated & transmitted
to the solids applied to them? this
is a most difficult Question. it is not enough
that we have found out nourishment
is applied to our solids, we must now
enquire how it is applied to them. &
here we must again call in Analo-
-gy of Plants. it is a well known
Fact that if any common vegitable
is brought into a warm Room in the
dead of winter vegitation imediately
appears in it. this has been attributed
by botanical Physiologists to Heat

promoting the Circulation of the Sap from the Root up thro' its Branches. - But if the same plant is placed behind a hot House in such a manner as y: one of its Branches can ~~insinuate~~ insinuate it: self into a window in the hot House all the marks of Vegitation appear in this Branch while the rest of ye plant remains dry. How shall this be accounted for? here the Heat could not act so as to promote ye Circulation of the Sap from the Root. it must then depend upon Heat or some other power y^t puts the Vegitable into a Condition fit to receive an Accretion

w.h: this power is It is not to our purpose to enquire. But in Animals the Growth of the solids depends upon the Action of the Heart extending them. hence we always find Growth proportioned to the Action of the Heart or the Distend.g power of the Blood. those parts grow most where the Impetus of the Blood is greatest, hence the great Size of the Brain w.ch: in Infants is never proportioned to the rest of the Body. the more lax & patent the vessels in any part are the quicker & greater the Growth of those parts to w.ch: these vessels are distributed. this in a few words may

serve to evolve the formation of the Animal System. From this you may easily comprehend the Reason why the Body continues to grow till the Solids & Heart are in an exact Ballance w:th each Other so that the former resists the extending power of the latter.

But before we enquire into those Causes w:ch stop Growth let us enquire into the Formation of the Bones. These early appear in the Original Stamina they are at first soft & gelatinous, but tho' time become so hard as to show little Flexibility. during their soft state they are colourless but

as they become Cartilaginous they appear yellow, & when they become hard or Bony they evidently shew red vessels wch may be seen 1st in the Middle of long Bones, & in 2d Centre of short ones gradually extending themselves towards the Ends & Circumference of the said Bones. these Blood-vessels proceed in right Lines wch is obvious to our ~~sen~~ Senses. From these facts it will appear that the powers of 3d Circulation must be called in to aid for the Formation of Bones. the Matter of the Bones is different from the Matter of the soft parts. It

Nutrition

is in the state of an Alkaline Earth & dissolves into a Neutral Salt by Acids. we have no Matter in ye Soft parts analogous to this. this Osseous Matter is deposited in seperate Cells of the cellular Texture & may be washed out from them before it becomes so hard as to Obliterate the Cellular Texture. see Dr Haller on this Subject who has fully proved a Succus Osseus. the only Question yet now remains is how it is formed? — the red Vessels we speak off tend 1st to give a due Extension to ye Bones & 2nd to pour forth the secreted Osseous Matter into ye Cellular membrane

which is formed on nervous fibres. Callusses are formed from an extension of the Periosteum & are evidently organized parts, & do not depend upon a mere Effusion of bony Matter. The Reason then why Growth ceases at a certain age is owing to the Force of the Heart no longer being able to propel the blood in the Bones so as to cause them to send forth fibres. – In all Cases of wounds where new flesh is formed a Inflamation must be excited in the Vessels so as to cause them to pour out more Nutritious matter to fill up the cellular Texture which has been produced. This cellular substance

is formed by the nerves wch I infer from its great Sensibility. the Extensile power then of the heart makes way for the nerves to pour out & to form this Cellular membrane. this Cellular substance may be so involved wth new matter as that its Sensibility may be destroyed unless an Inflamat^n is induced upon it by certain Causes. The heart does not increase in proportion to ye rest of the System, & hence our Growth is limited. the substance of the Bones becomes hard by Age so as to obstruct the Blood vessels they contain, hence a Resistance is produced to the Heart.

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I shall now briefly recapitulate w^t I have said of Nutrition.

In every part of the Body there are Nervous Fibres viz: are the Original Stamina of the Body but formed in such a manner as to admit of an accretion of cellular Membrane. this I think sufficiently proved 1st from Analogy of vegitables 2nd: from formation of Bones & 3rd: from the Production of Callus. — I do not pretend from this to explain all the Phenomena of nutrition. those may follow afterwards. the Growth of the Body I said depends upon the

Nutrition

Action of the Heart but to this we must add Compression which has some Influence in determining the Force of the Solids. I do not pretend to say why the Force of the Heart's Action does not encrease in proportion to the Rest of the Body. we are sure of the Fact, & this is sufficient for our purpose. Growth is always greatest in the Beginning & least as it Approaches towards its Acme. It is not uniformly the same in all parts of the Body which we said depend upon some Vessels being More lax & patent than Others. This Disproportion is most Manifest in

Nutrition

in the Head wch we see first arrives at its Acme. Hence the Reason why the Effects of a Disproportion between the Fluids & Vessels so often appear in y Head such as Haemorhages - Serous Defluxions &c wch are always peculiar to Young Children. When the Ballance of between the Fluids & Solids is established we find the Effects of Plethora in the Lungs where the Resistance is least hence y Frequency of Haemorhages from them in Young Men. the last Effect of the Powers of Evolution is to form y Genital Organs wch gives a new Ballance

to the Arterious & Nervous System.
— a want of this Evolution tends to
weaken the Tone of the System.
hence an Obstruction of the Menses
is often attended wth Atonia than
a Plethora. a Vallame is likewise
formed when the Body arrives at
its Growth between the Arteries & Veins.
— if the veins or Excretories received the
Arterious Blood wch too much facility
we shd see no Growth, but at y^e
same time the Resistance of the veins is taken
off. the Density of the Arteries be=
=ing increased by the Accumulation
of the Blood, & the Plethora than

Nutrition

appears no longer in the Artery but in the veins. here you see the Reason why young men are most subject to Arterious Haemorrhages and Inflamat.y Diseases & old men to all the Diseases that arise from venous Plethora.

Qu. 4th Question occurs here how is Nutrition performed after the body arrives at its Growth?

— to this I answer that there may be Erosions & Solutions of the Calcarious Matter of the Bones ch. w: disposes them to be absorbed & so carried out

of the System. Attrition some day is constantly wearing away the solid matter of our bodies. This can be performed only in the large ves=sels, but we have no proof of its taking place. The blood is applied to polished surfaces wch are notliable to abrasion. The surface of every part of the body is provided wth secre=ted juices wch prevent the immediate contact of the fluids wch pass thro' them. Nor can I admit Erosions or solutions taking place except in morbid Cases which brings on death

to our former Ac.t of the Causes of the Growth of the body. The Nutritious Matter then when applied after the body arrives at its Acme instead of giving greater ~~dens~~ extension gives greater Density, hence the Solids are always growing harder insomuch that in extreme old Age they are no longer pervious to the circulating Blood. This Gentlemen finishes not only Nutrition but our Physiology in General. we shall next proceed to the Pathology.

Pathology treats of the morbid state of the Animal Body. It is of two kinds, 1 General & 2 Special. the first treats of Diseases Abstractly by investigating their Causes & Effects. the second is that wch treats of the Causes & Effects of Diseases as they occur in particular Persons. so that the first gives the Pathology of Physiology, the second y Pathology of the Practice of Physic.

I shall begin by giving a Definition of a Disease by wch I understand that Condition of an Animal Body in wch its Functions are not performed at all

a Disease what?

or very imperfectly. see § 34 of Dr Gaubius's Pathology. a Disease has been considered by Physicians in two ways 1st as an apparent - manifest Interruption or Lesion of the Actions of the human Oeconomy without any Regard to the internal State of that Body. this is the view which common People have of Disease. the 2nd way (wch is peculiar to Physicians) of considering a Disease is it is that Condition of the internal parts of the Body wch unfits it to perform its Ordinary healthy Actions, wch Condition is to be found out by Reasonings. this is Dr Gaubius's Definition of a Disease.

a Disease what?

a Question arises here & y^t is wch of these Definitions shall we admit? For a long time the 1st of them was only employed by Physicians, and indeed we arrive at our Knowledge of Diseases only by certain ~~appe~~ external appearances. I adopt therefore the Definition I gave when I set out, that is the 1st of these Definitions viz: that it is that Condition of the Body in w^ch (& not by wch as Dr. Gaubius has it) its Actions are not at all performed or performed the w: Difficulty. our chief Regard then must always be paid to the external appearances without any attention to the internal State of the Body in forming our Judgm^t of the Presence of a Disease. But now

shall we know when the Body deviates from its healthy state? ~~since~~ every Persons Constitutions differs & w^h is Health in one Man would be Disease in another. Besides I believe few Men in the World enjoy uninterrupted Health. we must then allow a "Latitudo Sanitatis" & our Judgment of Diseases must be deduced from a Medium state of the Body when supposed to be in Health w^h: must include the Deviations from Health w^h: arise from Age Sex & Temperament, as also the Imperfections in the Exercise of the Functions in particular Persons w^h: arise from Fatigue &c. these are

a Disease what?

never to be considered properly as Diseases since no One is exempted from them, & since Nature herself quickly removes them by the ordinary powers of the Oeconomy. I now Repeat again y: that state of the Body only is to be considered as a Disease when y Functions of the healthy Body are so interrupted as to be performed w: the uneasiness for a considerable time & w: are Obvious to our Senses. I must add here that our notions of Disease must likewise include the state of the Mind. But here too we must allow a Latitudo "Sanitatis" Physic has nothing to

a Disease what?

do w: any Diseases of the mind w: do not depend immediately on the State of the Body. Folly & vice are the Objects of Philosophy & not of Physic Unless we can prove they Arise from some morbid affection of the Body. —

I go on now to explain other Terms in Pathology. Diseases are marked or distinguished by their Causes, for every Disease is an Effect w: depends upon a Chain of Causes. this may be illustrated by supposing a Man in a sea Fight killed by a Splinter struck off from the side of the ship. the Splinter here was the Immediate or proximate Cause of

the Means Death, but a chain of Causes conspired to produce this such as ye Ball y^t broke off the Splinter - the Cannon from whence the Ball came - the powder that drove it & the Spark that set fire to it. all these are considered as remote Causes.

The immediate or proximate Cause of a Disease is that state of the Body in wch the Functions cannot be performed properly or wth Ease. thus in a Rheumatism the proximate Cause is the Over Distention of the Vessels of the part affected. but a Series of Causes conspire to produce this Case such as Obstruction - an Increased Action of the Blood Vessels - the Operation of Cold & the like. all these last Causes are distinguish^d by ye name of Remote. Remote Causes are seldom

simple, but mostly act in Conjunction w: One Another. Thus the Obstruction & the increased Action of the Blood Vessels in the Rheumatism are always combined together. let us take another Example. the proximate Cause of an Ascites is an Accumulation of water in ye Abdomen. this Accumulation is owing to ye vessels exhaling too much Lymph. this Exhalation may be owing to a Stagnation of Blood in the Vena portarum. this Stagnation may be owing to a Suppression of some usual Evacuation such as the Hemorrhoidal Flux w: Suppression was occasioned by the Application of Cold

Cold here was the only remote Cause. All the Other Causes are so combined that they are to be considered as parts of the proximate. Our Indications of Cure therefore in Diseases is always proportional to the Nature or Number of the proximate Causes. So that every Change you see induced upon the Body is to be considered as connected w: th the proximate Cause. Even the Remote Cause is sometimes connected w: th the proximate. thus if the Splinter we before spoke of continues in a wounded part so as to keep up a constant Irritation it is then to be

Causes of Diseases what?

considered as the proximate Cause of it. In a word then every Cause that gives Rise to an Indication is to be considered as part of the Proximate, & those as Remote wch do not give any Foundation to Indications. Predisposing Causes (of wch we shall speak hereafter) may sometimes act as proximate. thus if a Man from a plethoric State is subject to Haemorhages, this Plethora is considered generally only as a predis=posing Cause but I think it should be con=sidered as part of the proximate Cause as it requires an Indication of Cure to remove it. proximate Causes have

sometimes been called Continent Causes as comprehending all the series or Chain of Causes wch conspire to produce the Disease. this certainly gives us the most distinct view of the nature of the proximate Cause of a Disease. See Dr Boerhaave's definition of the proximate Cause wch I think by far the most unexceptionable of any I have yet seen § 740. the Causa proxima is the only true physical Cause of a Disease see Dr Cullen's § 61. & § 74. according to Wolfius the proximate Cause of a Disease is that Cause upon wch the Actuality (as he calls it) of a Disease depends. all the

Causes of a Disease what?

Other Causes connected with the proximate he calls Principia or only possible Causes. M: Sauvage has adopted this Distinction & uses it thro' his work. Could we adopt it likewise it would overthrow all the Distinctions of proximate & remote Causes, & thus give us more simple Views of the Causes of Diseases. the word Principia includes every Cause that is not proximate. But however just this Distinction is we must not dissent so much from the common Language of the Schools as to adopt it.

One more Difficulty occurs here & yet is how shall we distinguish a Disease from its proximate Cause? See Dr Gaubius answer to this Question § 60.

Causes of Diseases what?

he considers causes as acting simply as Remote but when they are com=
=bined so as to produce a Disease he calls them proximate. but this notion is peculiar to himself. Dr Boerhaave was sensible of the Difficulty of this Question see Again 2740. the Diffrence then be=
=twen a Disease & its proximate Cause may easily be resolved by having Recourse to our Definition of a Disease viz: that it consisted in apparent & uneasy & permanent Lasions of the Functions of the Body. the proxi=
=mate Cause is that wch occasions these Symptoms.

Causes taken in a larger Sense are very Compound. some Causes act only on certain Bodies, & some Bodies again

Causes of Diseases what?

can only be acted upon by certain Causes. in the human Body the Body is the Patient, external Bodies are the Agents wch act on it, & these Agents will act according to the Condition of the Body. — If a Body is affected by an Agent that does not act on all human Bodies universally that Body is said to be predispos=ed to such an affection, & this Cause is called in Latin "Causa Predisponens" — these Agents wch act only in Cases of Predis=position are called Occasional or provoca=tive Causes. hence Dr Boerhaave speaking of Occasional Causes says "Solis occa=sionibus predisponitur", see also Dr Gaubius §59 on the Distinction of these two Causes.

Causes of a Disease what?

It is not sufficient therefore in enumera=
=ting the Causes of Diseases to mention the
Occasional Ones Only. the Remote Causes
should always be pointed out likewise as
those Causes ch w operate alike on all Constitutions
without any peculiar predisposition. thus a
certain Degree of Force will produce a Fracture
in every Mans Skull. here then you see
a Remote Cause producing a Disease without
any Predisposition. But Again a Predispos=
=tion may produce a Disease without an Occa=
=sional Cause such as a Plethora which Often
induces a Hemorrhage without any Occasio=
=nal Cause to excite it in those who are disposed to it.

Cover

Symptoms of a Disease what?

This finishes our Acct of the Causes of Dis:
=eases we shall now go on to mention
the Terms used to express the Effects of Diseases.
a Symptom is every apparent Deviation
from the usual ordinary healthy state
or every Phenomenon wch does not occur in
Health. It is always somewhat externally
evident. a Symptom may sometimes be ye
Disease itself as in the Case of the Loss of Sight.
— but a Case of this kind very seldom occurs,
Even in a Loss of Sight is always attended
wth more or less of a preternatural Enlargement
of the pupil or with Head-Ach. a Disease
then & its Symptoms may in almost all Cases
be distinguished from each Other. see Gaubius
§ 86.

Symptoms of a Disease what?

Symptoms have been viewed in different Lights from their Causes & have been divi-
-ded into 3 kinds 1st Symptomata Morbi.
2 Symptomata Causæ & 3 the Symptomata
Symptomatum. the 1st are the Symptoms
of the proximate Cause. the 2d are the
Symptoms of the remote Causes. the 3d
are secondary Symptoms proceeding from
the two first Symptoms. all this may
be illustrated by taking notice of a
Pleurasy. thus pain - Fever & Cough
are Symptomata Morbi or Symptoms
of the proximate Cause, but if a Coryza
or Angina attends a Pleurasy it is

called Symptoma Causa remota, or Symptoms arising from the Action of Cold. the Difficult Respiration wch is the Effect of the pain & not merely of the Inflammation is a Symptoma Symptomatis. the Distinction of these three kinds of Symptoms have ~~some~~ their use in Physic. — Those Symptoms wch are Pathognomonic Signs of a Disease are properly called Symptomata Morbi. the Symptomata Causa seem rather to arise from a Conjunction of two different Diseases. thus a Hamorrhage sometimes attends Epilepsy when it arises from Plethora. but here are two Diseases for we often have Plethora & no

Epilepsy & vice versa, & we moreover find the one often continues after the other is removed. see Dr Gaubius §94. the Angina w.h attends a Miliary Fever is by no means to be considered as a Symptoma Causa, but as a superadded Disease w.h often requires a different & particular Cure.

The Symptomata Symptomatum are not necessarily present. thus a Person from being afflicted w.h a Catarrh may vomitup Blood. here the Haemorhage from y.e Lungs is a Symptoma Symptomatum arising from the Catarrh but it does not always ne=cessarily follow a Catarrh. these Symptomata Symptom.m: altho' they dont necessarily occur

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William Mahon

are nevertheless necessary parts in the History of every Disease as they depend on or arise from the proximate Cause. Sometimes it is difficult to distinguish whether they are Symptomata Morbi or Symptomata Symptomatum viz: show still further the necessity of enumerating them in the History of a Disease. they moreover tend to point out to us the Degree or violence of a disease.

Dr Gaubius has introduced two other Distinctions of Symptoms viz Symptomata Activa & Passiva. the 1st he supposes to be certain auxilliary Symptoms viz: owing from the Efforts of Nature to cure herself when diseased. thus if vomiting in Consequence of something poisonous

taken into the stomach arises from the Efforts of Nature to remove w: Offends her. But here the poison acts Mechan:-nically on the Stomach, & by its Irritation brings the stomach into Contraction w: causes it to throw up w: lies there. in a word those who adopt the notion of Symptomatic Fevers suppose that they are all the mere Opera:-tions of the Soul itself exerted in Order to re:-move any thing that Offends her. I grant the Animal Body has a power to obviate the Tendency of the Causes of a Disease but we have no Reason to suppose this depends upon the Action of a rational in:-telligent Being, if it does act it must be Mechanically in Conjunction w: y Body

Symptoms of Disease what?

I grant likewise such Symptoms do ex-
ist as may be called Symptomata
Activa or Auxillaria wch are essentially
different from the Symptomata passiva.
The Symptomata Activa are but distin-
guished in a Fever. during the cold Fitt
Symptoms are merely passive but during
the hot Fitt the Symptoms are Active
as Nature is then making Efforts to remove
the spasm wch causes the Fever. but there
are certain Symptoms wch we cannot tell to wch
of these Classes to refer them, such as re-
mors &c there are likewise many Other
Symptoms in all Diseases wch we cannot
tell wch they are, whether they are Active

or positive. But there are other Symptoms to be taken notice of besides these. A man who is already afflicted with a Disease is liable to be afflicted with any other accidental Cause which may cause a new Disease. thus a Man in a Fever may receive a Blow in his Head which may bring on a Train of Anomalous Symptoms. Now these Symptoms are called "Symptomata Fortuita", & shd be closely attended to, as they are either Nocentia or Lædentia. Upon this Acc: Symptoms are distinguished into Essential and Accidental or according to Dr: Gaubius into "necessaria" & non-necessaria".

Symptoms of Disease, what?

But Farther a Disease we said consisted in a Concurrence of Symptoms. — but these Symptoms vary exceedingly during the Course of a Disease, hence they ~~they~~ have been again divided into "simultanea and perpetua" the first occurs mostly in the Beginning of a Disease. the last more probably characterise a Disease.

This finishes our Explanation of the Terms of Pathology. we shall now proceed to the Division of the Institutions of Pathology. we shall therefore in our present Lectures begin

1st By considering the proximate

A

Plan of Pathology.

Cause of Diseases.

2nd: we shall treat of the Symptoms of the proximate Causes &,

3rd: we shall consider the Remote Causes or the potestates hoc ivo as well as those which are occasional and act only in Cases of Predispositions.

I The proximate Causes of Diseases are seldom simple. they often consist of a Complication of Causes which affect and operate on different parts of the body — But we shall notwithstanding endeavour to consider them in as simple a Manner as possible as affecting either

the Solids or Fluids. we shall begin by pointing out the proximate Causes of Diseases in the Solids. these are to be considered as simple, or as Solida viva. the Pa=
=thology of the simple Solids I delivered pretty fully when treating of the Physiology of them. I shall therefore proceed to speak of the Diseases of the Solida viva or of the moving Fibres. By the Solida viva I mean all the Organs of Sense as well as Motion, as these are ye two principal functions of the Nervous System. I shall begin by considering the Morbid States of Sensibility.

I Sensibility is always relative

to be by Temperament or Idiosyn=
=crasy. we cannot pretend to establish
a standard of it. we can only point
out w^h Increase or Diminutions of it are
Morbid. we shall therefore consider the
different Circumstances which influence the
Sensibility of our Nervous Fibres in general,
but more especially those of the dentient
Extremities. Sensibility we know depe=
=nds upon a certain Condition of y^e nervous
Fibres w^h we before presumed was owing
to a subtile Elastic Fluid always adhering
to the nervous Fibres. Sensibility will then
depend i^n upon the Mobility of this
Fluid. the more rare & Elastic the more
moveable it becomes. this Fluid will

likewise depend upon the Nature or Aggre=
=gation of the Solid Substance of the Nerves,
wch we know are widely different according
to the Nature of the Original Stamina.
we presume then that Sensibility will
be considerably influenced by the State
of the Original Stamina. hence we
find a peculiar kind of Sensibility
often runs thro' Life in certain Con=
=stitutions. this appears more probable when
we recur to wn we before said of ye Nerves
being the Organs of Nutrition. we presume
still further that Sensibility is influenced
by the Original Stamina from ye Changes
wch Sensibility undergoes in different

States of Life. Infants we see have less Sensibility than Children farther advanced in Life. we find indeed that Sensibility is encreased till the Body arrives at its Acme, from wch it appears that the nervous substance as well as the simple solids are acquiring a more firm Texture thro' time. the Brain is always heavier in proportion to the progress of Life, from wch we infer that the nervous Fibres are likewise acquiring Density as well as the Brain.

2nd External Bodies influence the State of Sensibility such as Heat & Cold.

a. Heat first excites the Mobility of the nervous Fluid & very considerably influences

(2) "The Ignorance of the Africans & other nations who live under the Line may be attributed to other accidental Causes rather than to the Heat of their Climates affecting the Vigour of their Faculties."

$\frac{e}{y}$ different states of Sensibility in $\frac{e}{y}$ heroes. – in general we find it encreased by Heat: hence Constitutions are most sensible in warm Climates, & the People in hot Countries are always endowed wth more exquisite Sensibility wth Regard to every thing that those who live in cold Climates. But Again all Constitutions in every Climate are more sensible in Summer than winter. There is a certain Degree of Heat wch is most favorable to Sensibility insomuch that every Degree of Heat which goes beyond it rather diminishes Sensibility & is equally unfavorable to our Functions with Cold. It moreover takes off from the

generating power of Heat which we shall show hereafter is much connected with the Nerves. B, do Stimulants give more Elasticity or Mobility to ye nervous Fluid? our Materia Medica writers w^d: feign persuade us that they do from their Notions of Cephalics &c. for my part I know of no Stimulants that do excite the nervous Fluid so as to increase Sensibility. But we know another Class of Medicines called Sedatives that do influence Sensibility very considerably. These Sedative Medicines are either Chemical or Mechanical of w^ch: more hereafter. C, Sensibility will be considerably

influenced by the state of Tension in the sentient extremities. Nature has taken great pains to promote & keep up this Tension in the extremities of the nerves by the uniform manner in wch she has distributed the Blood vessels along wth the nerves. even in the Retina itself a layer of Blood vessels has been discovered. – they are likewise to be demonstrated very plentifully ~~in the~~ accompanying the minute papillæ of the Tongue. – We may presume from this that all the nerves in like manner are equally accompanied wth Blood vessels. Sensibility will therefore depend upon the Tension of these Blood vessels hence another Reason

(a) "I believe even Palsies may arise from a Compression of an Artery as well as a Nerve so much does the Arterial Blood influence Tension & Sensibility."

offer itself why Sensibility is increasing till the Body arrives at its acme upon the Account of the Disposition to Plethora or to the impetus of the Blood in the Arteries during Growth. But we have a still more convincing proof of Sension influencing Sensibility from the extreme Sensibility which different parts of the Body acquire when inflamed wch is solely owing to an Increased Influx & Impetus of the Blood into the Blood-vessels. even those parts wch have lost their Sensibility by an Excretion of cellular substance or from morbid Causes have it again renewed by Inflammation. Dr Haller has given us many Examples of this.

d, Sensibility of the nervous Extremities will depend upon the state of the Origin of the nerves. a certain Freedom of the Sensorium is Absolutely necessary to Sensibility. a Degree of Compression imediately takes off Sensibility. this is evident and obvious to every Body. But further Sensibility may depend upon the different states of Excitement in the Sensorium, which greatly affects the Extremities of the nerves. this Excitement may arise from a proper Degree of Tension in Consequence of the Influx of Blood there. an increased Impetus of the Blood we see then gives an additional Excitement to the Sensorium, & thus encreases

sensibility. the great sensibility we observe in Persons afflicted wth Fevers seems to arise from the excitement of ye sensorium being communicated to every part of the body. We often observe Patients in Phrensies & Manias that they have a greater sensibility in some parts than in others to peculiar impressions this seems to arise from one part of the Brain being in a more excited state than the other. in these Cases it is difficult to say whether the increased sensibility depends on an affection of the Organ on wch the impressions are made, or upon an

affection of the Sensorium itself. I can here adduce a curious Fact which seems to show that it depends on a morbid affection of the Organ itself. I once knew a Lady who laboured under a false Imagination & fancied she was perpetually surrounded wth Hobgobblins & Devils insomuch that she cried out often in the utmost Agony. many Attempts were in vain made to cure her, 'till at last the Physician who attended her removed it entirely by blind-folding one of her Eyes. 2nd: As an Excess of Sensibility depends on a too great Tension of the Brain so a want of Tension in the Brain may bring on a want of Sensibility

to external Impressions. this appears to be the Case in Idiots, altho I cannot say we have any proofs from Dissection of their Brains being in a collapsed flabbid State.
B. Sensibility is deminished by Compression more especially in the Sensorium itself.
C. Attention very considerably influences Sensibility. the Mind can be employed upon but one Object at one & when this is the Case it is insensible to all Other Impressions Unless they are much stronger than the One he is occupied with. thinking long on one Subject wearies the Mind, hence there is a Remission in our Attention from particular Objects.
- the Attention of the Mind will be greatly influenced by the Novelty of the

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Object by its being attended wth more or less volition or of interesting Relation. From this you see there may be different Degrees of Attention. When it is in a very high Degree it induces a Rigidity in the Brain insomuch that the Attention continues even After the Object is removed wch excited the Original Impression. This appears to be the Case in Catalepsy in wch the Patient continues in the same rigid Posture for a considerable time in which the Disease first seized him. These Catalepsies are generally bro^t on by very fixt attention. Fulpius gives us a remarkable Case of a Man

who upon meeting w: a Repulse from his Mistress remained in a fixt Cataleptic state for many days, & was cured by being told that his Mistress wd. be favourable after every thing else was in vain attempted to rouse him.

d. Sensibility may depend upon the different Degrees of Excitement of the Other of our Brain. we all know that there is an intermediate state of Sensorium between sleeping & waking. hence we call a Man of great vivacity "bien éveillé" & a very stupid Fellow a Creature half a sleep. if these Degrees of Sensibility then are so obvious we may readily presume that an additional Excitement in the Brain may greatly influence the Sensibility as

well as the Contractility of the whole System. But here a difficult Question occurs. we have Instances of the Brain's being in a healthy excited state, & the whole System in a morbid state of Tension in Maniacal Persons & yet what is very surprizing they are possessed of a high Degree of Insensibility to all external Impressions especially to Cold - Opiates - & Medicines of all kind. here is Insensibility connected with the highest state of Excitement in ye Sensorium. this seems to over throw what we have before advanced, but I think it may be reconciled with it. this state of the Sensorium may then depend upon

upon the Density of the Other being
encreased th: w: Regard to its Elasticity, for
the healthy Degree of Sensibility
depends upon a certain proportion be=
=tween the Elasticity & Density of the Other
of our Nerves. But another Solution
may be given to this difficult Problem
— we Observe the Insensibility of Maniacs
to be chiefly th: Regard to Sedative Impres=
=sions. But are Mettichs & Nurcotics
sedative? Some have supposed they
are, but I cannot say positively that they are.
One more Solution may be offered — a
Maniac may be considered in a State
of Excitement or in that State of Rigidity we
before spoke of in the Catalepsies. This

is evidently the Case in Melancholic Persons. & hence their ~~Atten~~ Insensibi-lity to Cold & Other Impressions may arise from their Attention's being previously too long fixed to One Object. in the Maniacs the Case is indeed diffrent for their Attention is perpetually running from Object to Object yet indeed in them the Excitement of their Nerves may be in the rigid state of Catalep-tic Patients, Altho' their Sensorium is not in that State

e, Sensibility is greatly influenced by Habit. - it is then always relative & never can depend upon the Absolute Force of Impressions.

So, lastly Sensibility depends upon the State of the Nerves or Organs of Sense themselves. thus the Crystalline Lens when more or less opake greatly influences vision. the Greater or lesser Thickness of the Cuticle will influence Sensibility in particular Persons & should always be attended to in enquiring into the different States of Sensibility in different Persons.

II Irritability. This is the most important & for the same Reason the most difficult part of Pathology. as being Deeply involved in the Mystery of ye Nervous System. I shall however

attempt to say something upon it, & endeavour to make it as clear as possible.

The word Irritability has been taken in different senses. The Physiologists understand by it the Contractility of Muscular Fibres. Dr. Gaubius calls it the vis vitalis. He understands by Irritability the morbid Excess of the vis vitalis. Is an Excess of Strength of Contractility in Muscles to be called a Disease? Dr. Whyt imagines not. See "Nervous Diseases" p. 91. & therefore attributes all Excess of Irritability to too great Fusibility or to a weakness of the moving Fibres. I grant when this Excess

of Strength in the Force of Contractility ~~which it~~ is diffused all over ye Body it is not to be called a Disease, but when it is in particular parts only or when greater in one part of ye Body than the Other then it may be said to be a morbid Case of Irritability.

I find it difficult to say in w^h Cases such a morbid Affection occurs. the Inflamatory Diathesis of the body perhaps may be considered as a Disease of this Nature.

an Inflamatory Diathesis consists in an increased Impetus of the Blood w^h depends on an increased Action of the Vessels & this is always proportioned to the

stimulus applied to them, or to the distending power of the blood. here there is an excess of the Force of Contractility. hence we often find instances of topical Fever or an encreased Impetus of the blood in particular parts without an encreased action of the heart & Arteries. this then being owing to nothing else but an encreased Contractility or Irritability in that sense in which Physiologists use the word. Other Cases of particular Irritability might perhaps be pointed out as depending on an excess of Tension in particular parts. there is a

young widow who has long been used to ven: enjoyments when first she is deprived of them, from a tension bro't on in the ven: Organs & Alimentary Canal to so high a Degree becomes subject to a train of Hysteric Diseases.

But this kind of irritability does not depend upon encreased Sensibility as Dr. Gaubius supposes, nor is it that kind of Irritability wh: is excited by gentle Stimuli, or gives Rise to what he calls the "Motus enormis" I must here Observe that the word Sensibility has been used in a too vague Sense. most of People understand by it a Power of the Body to be acted on

by external Agents. but I would confine its meaning to Impressions made on the Nervous System only or to an Impression on one Nerve which excites Contractions on other parts by the Intervention of Sensation. I would likewise restrict the word Irritability entirely to Muscular Fibres or a Disposition to contract in Consequence of certain Impressions. Irritability is only to be considered as morbid, when it induces irregular Contractions. a Facility of Contractility is by no means to be considered as a morbid Irritability.

See this more fully illustrated by Dr. Gaubius § 743. For ~~was~~ however much Authors may disagree in their Terms, they all agree in referring the Morbid Cases of Irritability to <u>Irregular Contractions</u> of Muscular Fibres whether convulsive or Spasmodic. Let us now enquire into the Cause of these Irregular Contractions.

1st They may depend upon a Morbid Affection of Irritability in y moving Fibres even while the State of y moving Fibres remain y same.

2nd They may depend upon Sensibility & Irritability being in an Excess or upon too great Mobility of the Nervous Fluid, or in Other words upon the Proportion

between Irritability & Sensibility being destroyed. in this Case a weakness generally attends the Contractions. hence they are peculiar to weak Habits - Young Persons & Hysteric Women.

3:d They may depend upon the State of the moving Fibres themselves, without any Connection w:th Sensibility. They depend upon a want of Tension, or upon too moveable Tension. most of the irregular Motions we perceive in the System arise from these Causes. let us 1:st enquire into the Diseases arising from a want of Tension. the most simple Affection depending on this Cause is 1:st Tremor. Tension

Often depends on a weight to a pendent. now if this is removed a Tremor naturally ensues. it would be easy to mention a hundred Examples of Tremors arising from this Cause. Tension likewise depends on a Fulness of the Blood-vessels in particular Limbs. hence a tremor of the Hand Often follows Venesection. Universal Tremors also are Often the Consequence of general Hemorrhages. Depletion may act too by taking off Tension from the Brain & thus diminishing the tonic power. the Passion of Fear acts in ye same

way. in a word Tremor almost al-
-ways follows a want of Tension. it is
more abundantly confirmed by our
being capable of removing these
Tremors either by weights appen-
-ded or by internal stimuli. hence your
Dram Drinkers who are so subject to
Tremors can cure them-selves at once by taking
a Dram w: ch acts by promoting Tension in y: e System.

. On what do these Tremors depend?
— I shall just offer a Conjecture.
perhaps on a want of ~~[illegible]~~ Density in y: e
Other of our Nerves w: ch gives it a
greater Disposition to Oscillations. this
is confirmed by y: e Analogy of Air & Other
Fluids w: ch are always most mobile when most
rare.

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2nd Convulsions wch are an Alternate Relaxation & Contraction of Muscles likewise depend on a want of Tension. these are then nothing but Tremors in a higher Degree. great Hemorrhages wch induce a general want of Tension often bring on Convulsions. perhaps their Operation may be confined chiefly to thier taking off the Tension & Excitement of ye Brain. this seems still more probable when we consider that the same Causes wch induce Syncope likewise bring on Epilepsy or general Convulsions. thus Blood-letting wch brings on Fainting

in One Person will bring on Epilepsy in Another. I consider then the sudenly taking off Tension or Excitement from the Brain to be the chief ~~to bro~~ Cause of Convulsions. perhaps some Other Causes may likewise contribute to ~~bring~~ on Convulsions, but all these are such as Operate on the Brain such as exquisite Pleasure or pain. how they Operate is difficult to say. It is enough for me that I have established the general Proposition. I shall Only Observe further that all the Causes which produce Epilepsy first produce

a Deliquium Animi wch is an additional proof of all Convulsions depending on a want of Tension in the Brain. On wt does 3rd Spasm depend? it is nothing but a higher Degree of Convulsions. or Convulsions wch do not readily admit of Alternation. it is generally more or lesp mixed wth Convulsions & almost always terminates them. Spasm likewise depends on a want of Tension as well as Convulsions. thus we often see a Muscle fall into a Spasm when the Antagonist Muscle is not in Action. hence we find the Cramp is removed by pressing the Foot

against a Board placed at the Bottom of a Bed, or otherwisely suddenly jumping out of Bed, so as to restore a due Tension to the Muscles of the Leg. Other Causes may bring on Spasm as well as want of Tension of w^ich we shall speak hereafter. To illustrate w^at has been said, I shall add that every Irregular Motion must encrease itself & produce higher Degrees of Convulsions: By Habit all our Actions are fixed to a precise Manner of Performance — to a certain Velocity & a regular Succession in Order. Thus every Man has his

manner of speaking, but if any thing interupts this manner, how easily is he thrown into Confusion by the Ballance of the System being destroyed! this will teach us how Stimuli produce Convulsions. they act by bringing on an encreased influx of the nervous Fluid & thus increase irregular motions which by time and Habit became natural to the System. Stimuli then act by hurrying the nervous power & thus bring on irregular motions which in all weak Habits must necessarily encrease themselves. What has been said applies to all Cases of Convulsions depending on Inanition

& not Repletion. the first we have already considered. We shall now consider the Second. which we said formerly ~~acts~~ acted by inducing too moovable & exquisite a Tension in the System. as Depletion from Hamorrhages induces an Atonia so Repletion or a Plethoric state of the Blood vessels gives a Moveable Tension which lays a Foundation for a Morbid Irritability.

1st This Exquisite Tension may depend on the Mobility of the Nervous System itself But 2nd It will depend on a too great Fulness of the Blood vessels arising

from a morbid laxity in the solids. — hence they easily yeild to ye Quantity & Impetus of the blood. this Fulness then gives a very variable & movable Tension. — this Laxity not only gives Occasion to exquisite Tension in ye whole System. But any thing that gives a laxity to a particular part & encreases the Impetus of the blood in it at ye same time will induce a Tension in a particular part of the Body. hence we find after the Paracentesis a Deliquium Animi ensues merely from the Tension being encreased in one part & Destroyed

in Another. Small Alterations in the Ballance of the System will always affect the Body in proportion to its Mobility. — In what Constitutions does such an exquisite Tension occur? In all Persons who have lax Solids especially in young People in whom the Impetus of the Fluids is greater than in Old People. Infants who have the most exquisite Tension of System are upon this Account most subject to Convulsions. This Predisposition to Convulsions is always encreased in Cases of very sudden Growth when the Solids are suddenly stretched; or where the Impetus of

these

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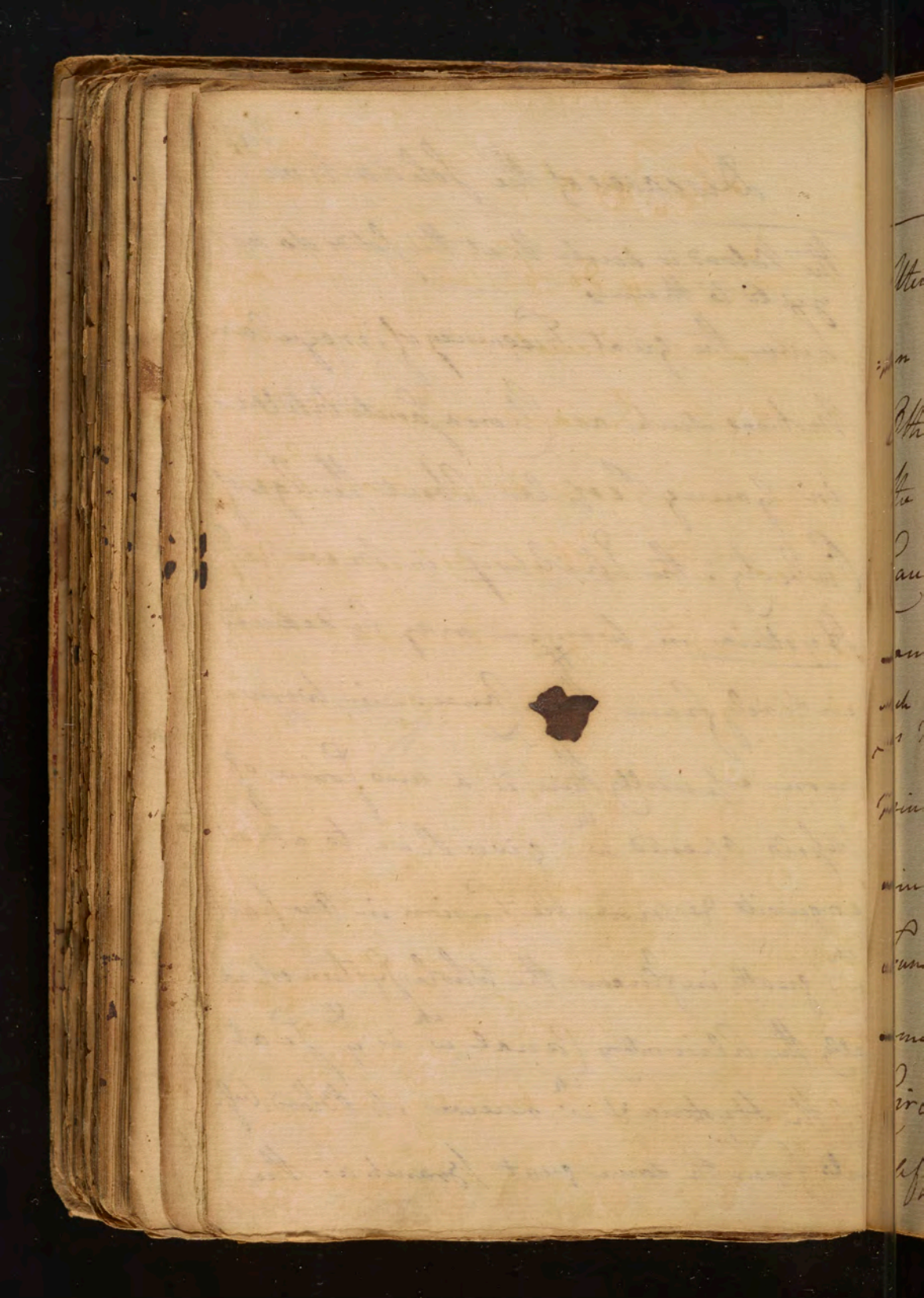
the Blood is such that the Solids do not yield to them.

hence the great Frequency of irregular Motions such as Chorea Sanctiviti &c in Young People about the age of Puberty. the Epilepsy in Men &c: Hysteria in Women may be deduced entirely from [illegible] Causes. in Women more especially there is a new Source of Vessels opened w: gives Rise to a most exquisite & Moveable Tension in one part w: greatly influences the whole System especially the Alimentary Canal w: is y Seat of the Hysteria & w: receives its Blood: Vessels from the same great Branch as the



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Uterus. Why do Hysteric Motions happen in some Females & Epilepsy in Others. the Diseases both occur in the same Systems & depend on ye same Causes. they likewise depend on the same predisposing & Occasional Causes such as Plethora & the various Passions of ye mind. even in their Symptoms they are similar both occupying the same Functions. nay they often unite in ye same Persons & at ye same time. What Circumstances determine the One to affect the Alimentary Canal &

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the Other the Vital & involuntary Motions? — the Answer to this I have hinted at. It seems in the Hysteria to depend upon the Communication between the Bread-beads of the Uterus & Alimentary Canal. The Hysteria is attended wth Spasms gradually rising upwards in ye same Manner as the Epilepsy. But the Epilepsy always rises higher & produces its irregular Motions only by reaching the Sensorium.

— By what Circumstances are these irregular Motions brot Abt? — Many Causes wch induce them act by taking

of the Excitement of the Sensorium.

Fear is the most common Occasional Cause of them & this we are sure acts in this way. But the Repetition of these Convulsions Motions cannot depend upon the Loss of Excitement in the Sensorium. we might indeed here call in the Effects of Habit to account for the Frequency of their Repetition. for we often find these Convulsive Motions occasioned merely by Plethora itself without calling in any external Occasional Cause especially when this Plethora is determined to the Head. hence I have often seen

able to foretel an Hysteric Paroxism merely from the Turgescence of ye Vessels of the Head. It is of great Importance in the Practise of Physic to attend to this Observation. The Plethora seems to act by inducing a too exquisite Tension of the System wch: disposes it to be affected by the slightest occasional Causes, the Blood is often determined most to one head of the Brain. This produces an Inequality of Distribution in the Blood's Course wch: may act as a Stimulus & thus bring on Epilepsy &

& Hysteria. we may from ye same Reasons account for the Convulsions wch sometimes attend a partial Phrensy. — But further in many dissections of Epileptic Patients we find Schirri & Ossifications in the Brain. these may act as Stimuli & thus joined wth Plethora prove an occasional Cause of Epilepsy by inducing an Inequality of Tension in the different parts of the Encephalon. this finishes our Ac: of the morbid Causes of Irritability. I shall only here repeat the Causes wch bring on irregular Motions. they are 1. Stimuli wch act without any ~~Concurrent~~ Predisposing

Cause ~~that~~ merely by producing hurried motions, w.h destroys the Order & velocity of our Actions. But they may depend 2nd On very great Sensibility w.h acts in the same manner as the Stimuli we spoke off, & is not unmated w.h the increased Irritability.

3rd Upon the Mobility of the nervous System itself depending upon the nervous Ether or the Nerves themselves

4 - Upon a want of Tension in the System

5th Upon too exquisite Tension. This is the most frequent Cause, as it exposes the System to be affected by a thousand occasional Causes of irregular Motions.

Diseases of the Fluids.

Having now treated of the Diseases of the Solids, both simple & nervous, we shall go on to consider the proximate Causes of the Diseases of the Fluids.

These ~~are~~ ~~cause~~ at first sight appear more simple & easier understood than the Diseases ~~of the Dis~~ of the Solids, But notwithstanding they have been the subjects of the Inquiry of Pathologists for 2,000 years I must say we know but very little about them. All I shall aim at is pointing out the Errors that Authors have introduced here. thus will the way be clearer for further Discoveries.

Diseases of the Blood

I shall first consider the Diseases of the common Mass of Blood. these either respect the whole Heterogeneous parts of the Blood or the several parts of wch it is composed. we shall begin wth the first. the Blood we know is of a middle Degree of Fluidity not so fluid as water, nor so viscid as many Liquors. we shall begin with considering the Excess in Viscidity or Lentor of the Blood. the Consistence of the Blood may depend 1st on the different proportions of its constituent parts, & 2nd upon the Quality

of these parts. Its Diseases will depend upon an over proportion or bad Quality of either the Red Globules or Coagulable Lymph. It is hard to ascertain the exact proportion of the Red Globules as we never can get them entirely seperate from the Coagulable Lymph. even the Coagulable Lymph too always carries with it a considerable Quantity of Serum. some have supposed that an excess of the Quantity of the Red Globules might be determined by their specific Gravity as they alone are heavier than water. But this cannot be done

as we cannot obtain them in a pure
state, nor can we measure them
by their Bulk as we never can tell
how much Halitus escapes from them.
— Nor can we form any Judgement of
their Quantity from their Causes. we
are ignorant in w^h Manner they are
formed, or w^h Aliment yields them most.
— In general they abound most in those
who are most healthy & vigorous so that
their Quantity may in some measure
depend upon the powers of Assimilation.
But
— even this is liable to Fallacy as we
find them in the Chick in Ovo where
no strong Assimilating powers are observed.

I have here formed a Conjecture. all the Fluids of our Body would escape from the Blood-vessels, however small we may consider them, was it not for the Red Globules which confine the other Parts of the Blood as being too large to pass thro' the Blood-vessels. — the Fulness — tension & Growth of ye Body then may depend upon the presence of Red Globules in the Blood. hence the Plethoric State may be considered as ye Cause of an Excess in the Quantity of Red globules. see Dr Gaubius §356. I do not imagine this Quantity of Red globules can dispose to Inflam:

Diseases. these depend entirely upon the Plethoric state indeed, & have no Connection wth the state of the Fluids.

2nd we come now to speak of the Quantity or Defecitude of the Coagulable Lymph. - how shall we judge of this? here new Difficulties occur. Bleeding Letting gives us no Light in this Question. we are ignorant of the proportion of it wch is natural to the Body. no Au that I know of has yet attempted it. we can form no Judgement from its Density as we never can tell to w^h a Degree the Spontaneous Separation has taken place.

— The Appearance of w^h is called Inflamatory Crust is no less fallacious, however much Physicians may infer from it. Even Dr Gaubius himself in §367 has fallen into this Error. this Inflamatory Crust I told you formerly depend entirely upon the Circumstances of the Blood's Seperation. Could we measure the Temperature of the Air — the velocity w^h wch the Blood flows from a vein & the given time in wch Blood always coagulates, then we might form some Judgement of the over proportion of the Coagulable Lymph, but this Experiment has not, nor indeed can be tried wth any decisive Accuracy. We

have many Cases of very sudden Condensations of the Blood. One in particular related by Jenal who tells us that he saw Blood coagulate in a stream while it was flowing from the Arm of a Man. But for my part I cannot admit these Facts. If any thing will determine its Quantity or Spissitude it must be ye Causes which induce them. Dr Gaubius mentions several Causes wch increase it such as Inflam^n Fever, but these Causes operate only by altering the Mass of the Blood & never produce any Change upon its Quality. I have seen an Epileptic Patient bled one day & found his Blood

entirely dissolved, & yet the Day after it had the Appearance of natural Blood w: a considerable Buffy Coat. I think then we must always refer the Phenomena of the Blood to ye Circumstances of the Circulation rather than to any Changes in the nature of the Blood.

— But Other Causes do influence the Quantity of Coagulable Lymph particularly Aliment especially when we add to this a due Degree of Vigour in the Assimilating power. for vigorous Assimilating powers always give the densest Fluids & vice versa. the proportion of Coagulable

Lymph is encreased wth Life. we cannot establish the Presence of Diseases from its Quantity or Quality, as different Men require different proportions of it according to their Manners of Life. When it is excessive in Quantity the Solids become proportionally rigid & thus resist any Diseases that might arise from it, & viceversa by wch means the Solids & Fluids are always kept nearly in a Balance to each other. But further Another Cause appears to encrease the Coagulable Lymph & dispose it to be more quickly dissolved in the Serum, so that an Error in the

(a) By this Means those morbid
Affections w: might arise from an
increased Quantity of Lymph in
Consequence of animal Food are
constantly Obviated by the quic
:or Solution of the Lymph in the Serum.

Quality of the Coagulable Lymph may be derived from the excessive use of Animal Food - hence we find those who live most on Animal Food are most disposed to putrid Fevers. (a)

But even supposing the Coagulable Lymph was excessive, yet such is its power of entangling Water than it would soon receive a sufficient Quantity of it to restore the proportion it ought to bear to Serum, or the watery parts of the Blood. (a)

Plethora then can only be induced by such an Affection of the Lymph, & not a preternatural spissitude.

Some have supposed that certain Substances ~~Aliments~~ of a viscid Nature give an

increased Quantity & Density of the Coagulable Lymph. See Dr Gaubius § 387. upon this Subject, where he attributes an increased Density of the Blood to certain astringents & spirituous Substances. these Substances have ~~have~~ such Effects when directly injected into the Blood, but I deny their being able to produce any such Effects when taken in, in the Ordinary way mixed with our Diet. Even Acids & Alkohal are capable of coagulating our Fluids only in a very concentrated state; now we are sure they never can reach the Blood in any other way, but in the most diluted state. the

Diseases of the Blood

further they go in the primæ viæ, the more they become diffused, & thus their coagulable qualities are entirely obviated long before they arrive at the blood. Febrii have been attributed to the use of Spirits in some of the viscera. but these Febrii depend rather upon the narcotic power of the Spirits than upon their coagulating the Fluids. Opium has long been supposed to operate on the Fluids but by long Habit it produces effects exactly analagous to Spirits. its operation then as well as that of Spirits is confined only to the Nervous System.

Even Acids when combined w: Metals as in Corrosive Sublimate, in w: they

Diseases of the Blood

are most concentrated excite no other action but that of stimulating, & instead of coagula: as some suppose, they rather dissolve the fluids.

Laetes cannot enter into our Blood except when dissolved, & they can only be dissolved into a saline form in which state they rather thin than ~~dissolve~~ coagulate the Blood.

Vegitables cannot coagulate the Blood except by absorbing the watery parts from it, this they cannot do as they are dissolved & their nature changed before they arrive at the Blood.

But w: shall we say to vised

glutinous aliments? Could these enter into the blood unchanged, they might produce a Lentor there, but we before proved that all Aliment undergoes a Fermentation in the Stomach: which destroys their Texture in such a manner as entirely to prevent any morbid Effects from them. After their undergoing this Fermentation they are again diffused in such a manner as to have their bifidity destroyed if any should remain after the Fermentation is over. But further, we find many Examples as among our Peasants who live on unfermented

Eat Meal, & yet these Men's Blood never discover any Marks of Viscidity — the Farinacea make the greatest part of the Diet of Mankind. now if viscid Humors were the Consequence of them, we should have them more frequent & universal than even those Physicians who maintain ~~its~~ their Presence have affirmed.

I conclude then that the Existence of a Lentor, or Preternatural Crassitude may be a possible Case, but we never can infer it from its Causes or Effects, nor do I know any Symptoms that will ever indicate its Presence.

Diseases of the Blood

If it can ever take place it ought to produce more dreadful Effects than are commonly attributed to it. I would therefore advise you to be very cautious in admitting this Doctrine for you will often meet wth it in Books.

3^d a Lentor of the Blood has been attributed to the Abstraction of the watery parts of the Blood. But when does this take place? Nature has wisely taken Care to keep the System in a proper Ballance. if the Quantity of Serum is diminished all the serous Secretions likewise are diminished, hence an Accumula-

tion of it in the Body. Dr. Boerhaave tells us that Sudorifics & febrile Disorders dissipate the watery parts of our Blood. But we have no proofs of this. Some other functions must be stopped to compensate for the Loss of watery sweat. — the heat of the Fluids too encreases the solubility of the Coagulable Lymph & thus the serous parts of the Blood are regenerated in proportion as they are dissipated. From all this I w.d infer that the Fluids are seldom or never discard by having their Density encreased. It is a possible case only: for my part I never saw it, nor do I know any proofs of it. —

Diseases of the Blood.

Let us now consider the Opposite Qualities of our Fluids viz their Tenuity. this may depend upon an Increased Quantity of water thrown in, or upon a want of proper Spissitude in them.

- It is very hard to tell when ye first takes place. Nature wisely prevents it. if the Quantity of water is encreased we find the Secretions proportionally encreased, viz: it. if Perspiration is Obstructed the Secretion by Urine is always encreased.

- if a morbid Tenuity of our Fluids ever does occur, it must depend on the watery Secretions being Obstructed, but

When this happens the quantity of water is still not encreased in our Blood. the obstructed water always runs into some Cavity & thus produces the different species of Dropsies. the Blood of dropsical Patients never shows a greater proportion of watery matter than is natural to it. the "Tenuitas Aquosa" may take place for a few minutes as in the Ischuria Renalis when a greater quantity of water is thrown into the Blood than is natural to it, but this is obviated by an encreased Perspiration. I conclude then that a morbid Tenuity never

occur in the Blood from an Excess of water in it.

But do not the ordinarily thick parts of the Blood loose their natural Spissitude & acquire the "Tenuitas Aquosa"? no - when they become preternaturally thin, their Qualities are altered, as in Scorbutic Patients, and they thus loose their properties which constitute them Animal Fluids. in those Cases the Coagulable Lymph alone is altered in such a manner as to unite more readily with water. in this way only the Blood becomes preternaturally thin, as this Union with water or Serum is always the natural Tendency of the Coagulable Lymph. the Blood in

these Cases viz: in Scorbutic Patients is broke down. this we prove from its Ten=
=mony & from its Escaping thro' parts of the Body w^ch: refuse its passage in a healthy state.

I conclude then that a Morbid Tenacity of the Blood may occur in some Cases from the Causes we ~~have~~ have mentioned.

. the final Cause of it may be because y^e: kind of Tenacity is less dangerous to the syst=
=tem than a Morbid Spissitude or Lentor of the Blood.

Let us now enquire into the Changes w^ch: y^e: Blood undergoes in its Qualities. It ~~was~~ were to be wished here we could

condescend upon the Changes of each of the Component parts of the Blood, but this would be a difficult Inquiry, as we are entirely ignorant of the true Nature of the Mixture of the Several parts of the Blood. — the Coagulable Lymph has been accused most of deviating from its Ordinary bland insipid State. the Sapid or saline State of our Fluids has always been considered as the Only Morbid Cause of them, & hence the Foundation of the much talked off Acrimony of the Blood. As this is a Question of importance we shall spend some time in enquiring into it. —

i — we shall Observe the Care Nature has taken to Obviate Acrimony in our Fluids.

- Our Aliment we find consists of the most bland insipid substances for the most part. Some things I grant that we take, are acrid as the Salts - the Condi: mentals & some Other things wch are of the Ap: pointment of Nature herself, & were designed originally for Our Nourishment. The Ho: position then concerning the bland Nature of our Aliment is by far too universal.

2nd Acrimony often attempts to enter the humors tho' not always in the way of Ali: ment. Nature indeed has taken great pains to guard agn it in the extreme Sensibility of the Tongue - Fauces & Stomach wch are generally excited to expel or avoid the noxious Matter wch enter into them.

Should they escape the Stomach they stimulate the Guts in such a manner as y^t they are soon discharged by a Purging. - I somewhat doubt whether the Lacteals are possessed of such a Degree of Sensibility as some have supposed; I believe many things enter into them; wch Physiologists are not willing to admit. upon ye whole then notwithstanding the Precautions of Nature I imagine Acrimony sometimes escapes the Tongue Fauces & Stomach & enters into the Blood thro ye Lacteals. - But Nature uses another power to avoid Acrimony entering the Blood viz: the Fermentation & Other Changes

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they undergo in the Primaria, even Diffusion itself is capable of Abating the Acrimony of most of Substances, especially when we add to this the several Matters that must mix w: the acrid Substances w: serve to demenish & destroy their Acrimony. But supposing Acrimony has entered into the Blood, I believe there are powers in the System w: tend to destroy it viz: the Oil in the Cellular Membrane w: is poured out so plentifully from the Blood. hence we find frequent Instances of its being very suddenly Absorbed or it were our purpose to cover Acrimony received in the Blood.

3d: But supposing ~~it~~ Acrimony has entered the

the Blood, & is not attended by the Oil, still I affirm it is often innocent. the Serum of our Blood acts as a Solvent to all acid matters, & thus prevents their mixing with the other parts of ye Blood — as soon as they mix w: the Serum they are immediately discharged by some of the Emunctories. all the actions they do excite are of such a nature as to excite an ~~ex~~ excretion of them from ye Body. — I do not suppose they act by exciting the action of the Heart & arteries. on the contrary I imagin they act only ~~to~~ on the excretory vessels themselves when they are discharged. From all this you see how much pains nature

has taken to avoid lurimony in the Blood.
4th But further granting its Presence
oftner than is just, it seldom acts
upon the more delicate parts of the Body.
I believe the Arterial System has no
sensibility to its Stimulus. even those
parts wch are sensible to its Stimulus are
provided by Nature wth a Mucous wch
guards them agst it. perhaps the Blood
vessels may be defended likewise from the
Stimulus of Lurimony by the Oil wch exsudes
from them as well as by their Insensibi-
lity to Lurimony. the Secretories of several
Glands are provided wth a Sensibility to Lur-
imony & happily for the System that it
is so, for by this means it is discharged.

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But allowing lacrimony to subsist in the System, Pathologists have reasoned wrongly in inferring Diseases either from its Causes or Effects. Dr. Gaubius deduced Spasms & Convulsions from it, but in 500 Cases I am sure they depend upon very different Causes. even the Aperation of our own Will is sufficient to bring on Convulsions without calling in lacrimony to account for them. Acrimony I own does take place notwithstand the Precautions Nature has taken to obviate it, & to such a Degree as sometimes to induce Diseases, but these are much fewer than has been supposed. They are moreover of a very subtile Nature which act as Ferments upon the Blood.

I mean Contagious.

We shall then consider Acrimony as introduced from without & as generating in the Body itself.

Acrimony that may be derived ~~from~~.

1st From the Aliment not directly acrid but becoming so by the powers of the Body.

2nd From a want of Aliment wch Abviates Acrimony in our System

3rd From those powers wch give a Tendency to Acrimony being encreased such as an Excess of Heat, or Circulation of the Blood.

4th From Changes induced in the Fluids by Errors in Secretion. of this we can say but little.

5th From the Changes wch our Fluids undergo from the Circumstances of their Stagnation. This is perhaps the most fruitful Source of Acrimony in our System — we know of no Fluids in the Body

which stagnate in a healthy state. even the Fatt itself is absorbed & poured out again constantly. all Fluids then previously effused have a Tendency to bring on Acrimony. every portion of our Fluids are of a fermentable nature provided they enjoy Heat & Air. now all Fluids effused in our Body have more or less of these, & therefore tend to those Changes which Fermentation naturally induces.

we have no Doubt but which Acrimony may be introduced into the System from all these Causes, but I repeat it again it has often been accused unjustly from its Causes & Effects.

But which kind of Acrimonies are they

which prevail in the Blood? Here again we meet wth great Difficulties. We generally refer every kind of Acrimony to Saline Matter. of w^t Nature then are ye Saline Matters of the Blood? We know there are many different kinds of Salts in Chemis^y wch are of a simple & Compound Nature. The Simple are Acids & Alkalies. Let us first enquire after the Presence of these two in the Blood. Formerly all Diseases were Attributed to One of these, & Remedies were Ordered accordingly to Obviate & Obtund them. Let us attend first to the Acids.

I we Daily take in Acids & acescent Substances in Our Aliment. even those Substances

wch are not naturally acescent become so in the Stomach. Notwithstanding this Dissolution of an Acid from all our Aliment it is always removed in the Process of Chylification. We have no proofs of the Presence of an Acid in any parts of the Body except in the primæ viæ. Let the Degree of the Acid in the Stomach or its Quantity be ever so great, it is always more or less covered before it arrives at the Blood even supposing the Assimilating powers to be ever so weak. It would consume too much time to enquire into the Nature of those Substances wch are supposed to give the most Acid Aliment, or to treat of those Causes wch weaken the Force of the Assimilating

Poisons. But 1st. shall we say to the Mineral Acids? – they act as Poisons, & therefore do not come immediately under our Notice here. 2d: Diseases arise from the Acid in the Primæ viæ 3d: is evolved from our Aliment? they are 1st the Heart Burn. 2nd the Morsus ventriculi 3d: Pica & sometimes Bulimia. there are other Diseases arising from it, such as the Feelings 4th: are peculiar to Gouty Persons. all these Affections do certainly depend upon the Presence of an Acid in the Stomach & are greatly influenced in their Volume by the Degree & Quantity of this Acid. But there Other more considerable Affections

(as) "It may be a subject of Inquiry Whether these Diseases of the Bowels depend upon the kind, acting simply upon ye Bowels, or upon its not being sufficiently neutralized by the Bile, or Lastly upon fixed Air evolved from the Aliment during ye further progress of Fermentation of ye Aliment in the Guts" —

w: arise from the circumstances of fer:
mentation in the primæ viæ viz: from the
extrication of the nitric air w: act on
the nerves of the stomach, & thus indu:
ces Atonia w: lay the foundation for
all those spasms & irregular motions w:
we find the stomach subject to when the
Cholera Morbus & many other Diseases
of the bowels are more or less induced by
this Cause. the acid of the stomach altho
it sh: escape unchanged thro' y Duodenum
from the action of the Bile, yet it produces
Diseases only in the Intestinal Canal such as
Dyarrhea Gripes - wind &c. I admit then
the acid action in Diseases of the Intestinal
Canal. But does it go further? I answer

we have no proofs of it in the Lacteals or Mass of Blood. It may be present Materially Here i e involved & covered in such a Manner as to shew none of its Effects, But I deny our having the least Reason to suppose it is Formally present there. This Infer 1st from an Acid seldom or never appearing in the Intestines After the Effusion of Bile & pancreatic Juice to the Aliment, to wch we may add the dilating power of the Lymph wch mixes w.th the Chyle in the Lacteals. 2nd from the Nature of the Assimilating powers in the Blood. These are very extraordinary & surprizing. hence we find fixed Alkali changed into volatile, & all Aliment yields an Acid which we shall

say hereafter enters more or less into the Composition of the Blood.

3 from all our Humors tending to Putre=faction wch effectually obviates the Consequence of an Acid in the Blood. But wd shall we say to the Milk which yields an Acid as soon as it comes from ye Breast? — this Acid is the Consequence of Fermen=tation, & never exists formally in the Blood, nor do we know any thing ye can decompose it in the Body. Besides previous to its evolving its Acid it requires all those Circumstances wch are necessary to Fermentation, such as Heat Air &c. Even supposing that it really exis=ted in the Chyle formally, yet it is always

so covered as never to show any of its Effects. but I cannot admit it ever being formally present in the Chyle. I conclude therefore that no such thing as an Acid Humor ever prevails in our Blood notwithstanding it has been maintained by men of such considerable Characters as Dr Boerhaave & Dr Gaubius. the Diseases attributed to an Acid in the Blood by both these Authors may be accounted for upon more simple Principles. I acknowledge however that Mineral Acids may sometimes be present in the Blood if taken by Accident into the Body, for we know of no powers in the System capable of changing it.

I acknowledge likewise that vegetable lind enters into the Composition of Animal Matters. Now this lind may sometimes be in an Improportion to the Other Matter it unites with, from an Excess in the Quantity of vegetable or putrescent Aliment. I allow it therefore a possible Case that there may be a morbid Acidity in the System from this last Cause, but I deny our having any proofs of its being formally present in it. I even doubt whether particular Aliment such as Animal or vegetable have any Tendency to produce an Over proportion of acid lind, or any Decomposition of the Animal Fluids, notwithstanding so much has been wrote & said upon this subject.

II: Let us next enquire ⁊ the Presence of a fixed Alkali in the Blood. This not-
-withstand: all the Disputes concerning its Origin is a Product of Nature but Fire is always near or ready to extract it.
- Now we know of no powers in the Body capable of evolving a fixed Alka-
-li from Our Fluids altho it may be pre-
sent there in a compound state. within these 30 years Alkaline Medicines have been taken in great Quantities as Lithon-
-triptics & these have been supposed to produce an Alkaline Lurimony in the Blood. Dr. Cox hare is ⁊ princi-
-pal Author who maintains this Doc-

= trine. I grant it is hard to refuse Facts but when they are solitary I think we may be sceptical w: the Regard to them. - if Alkaline Salts ever reach the Bladder so as to dissolve Stones then, we might infer their Presence in the Blood, but it is very doubtful whether these Salts ever reach the Urinary passages so as to produce any dissolving Effects there. The same Relief w: Alkaline Salts give in Cases of Stone may be Obtained from Medicines w: have no dissolving powers. Even Sulphur Bay did dissolve the Stone in y: Bladder yet still I would rather suppose they were accumulated in the Bladder, & did not enter

into Mixture wth the Blood. The Alk. Salt taken in Lime water is very small, & are generally washed off by the water taken wth them. But further all Alkaline Substances in common wth Acids, are more or less destroyed by their Diffusion in the Primæ Viæ, & by mixing wth the Acid of ye Stomach. — Some tell us the Urine has yielded marks of a fixed Alkali, but I deny ye Fact. I grant it contains a volatile Alkali & this, it is highly probable has been mistaken for a fixed Alkali.

But from whence does the dissolved state of the Blood arise Dr Huxham speaks so much off? — But here we must complain that Dr Huxham has neglected

to inform us of the precise appearance of the Blood, & in what manner it differs from the Blood of Gouty Patients. Besides we may account for the dissolution of the Blood w:th out supposing the Alkaline Salts acting upon them. all Alkaline Salts are neutralized in the Stomach & we shall show by & by that neutral ~~Salts~~ Salts have a power of dissolving the Blood. Further by destroying ~~the~~ the acid of the Stomach they may obtain something w:ch was absolutely necessary towards forming the Animal Fluids, & hence the dissolved state of the Blood. I believe all the Absorbent Earths would act as powerfully in dissolving the Blood

as Alkaline salts merely by Abstracting the due proportion of Acid from our Fluids. — the dissolved Appearance of the Blood in the Jaundice depends upon the same Cause by an Abstraction or want of ye: Acid ye: usually enters into ye Composition of our Fluids. I conclude then that no such thing as a fixed Alkali ever exists formally in our Blood.

But have we any proofs of a volatile Alkali in the Blood? We know there are means of changing fixed Alkalies into the volatile by the powers of the System. There are means too of changing fixed Alkalies into volatile by means of Alcohol. May not the ~~fatty~~ Oils of our Fluids Operate in the same way? — It appears then

highly probable that volatile Alkalie is always present in Animal Fluids? - But is it ever in a seperate state? we generally find it in the form of an Ammoniacal Salt. But may not Putrefaction evolve it? - This is doubtful. - in Cases of Gangrene a volatile Alkali may be evolved, but it is always confined to one spare only; for as soon as ye whole mass of Fluids is affected w: it, sudden Death is immediately brot on. Dr. Gardiner supposes in § 310 that a volatile Alkalie may be present in ye Blood in a seperate state, & mentions ye several Causes w: introduce it there. The 1st is the

(a) and the *filaguosa* of *Ray*.

(b) For an Acc. of the Spiritus Rector see Dr. Boerhave's Chemistry.

use of vegetables abounding wth vol: alkalie such as ye Tetradynamia of Linnaeus. (a) But I doubt whether these vegetables contain a volatile alkali in an uncompounded state, but if they do it is in very small quantities, hence we find their whole Bouquet or Spiritus Rector (b) dissipated by drying them.

But supposing it present in large quantities the liquid of the stomach would immediately destroy it, nor are these kind of vegetables ever taken in the body in sufficient quantities to afford any quantity of such an alkali, the plants of the Tetradynamia wch we use most are the Brassica in its various forms & the Parsnip. Now each of these contain but little acrimony after they have been

boiled & had their Skin pained from them.
But granting ~~that~~ that y: enter
the Body yet is it of so Stimulat & Vo:
latile that it soon vomits or purges or if
it enters the Blood it immediately flows
off by insensible Perspiration. Upon the
whole I conclude there is no y least
Probability of a Volatile Alkali in our
Blood from acid substances taken in.
The 2: Source of this Volatile Alkali w: th
Dr Gambius is, y volatile Alkalie may
be seperated from y lemonade: Salt
of the Blood by means of a fixed Alkali
introduced into the Blood, but I deny that
wo a fixed Alkali can enter y Blood

in such a manner as to decompose the ammoniacal salt of our Fluids. even supposing the fixed Alkali did evolve a volatile alkali from ye Fluids effused in the stomach, yet it would soon be discharged by the end of the stomach, or discharged by vomiting or purging.

Dr. Gaubius speaks of Soaps decomposing the ammoniac: salt, but all we said concerning the impossibility of a fixed Alkali decomposing it applies equally well against the Soap. Nor are Earths capable of decomposing ~~Soa~~ the ammoniac: salts of our Fluids, for they never can operate in this way unless assisted by greater Heat than ever prevails in the animal Body.

a 3rd Cause of volatile Alkali according to Dr. Gambius is the taking in of aromatic Substances wch by encreasing the Circulation of the Blood evolves its Salts more copiously. But they are never taken in such Quantities as to produce such Effects, & even supposing they did I deny that they have any tendency to decompose ye ammoniac Salt of our Blood. perhaps they may tend to encrease ye Quantity of this Salt.

His 4th Cause of volatile Alkali is Poisons taken into the Body. I grant some Poisons dispose our Fluids to immediate Putrefaction by wch means a volatile Alkali

may be evolved from the Animal Salts
But when this is the Case, sudden Death
is immediately brot on & the Patient no longer
becomes an Object of Physic. But I
doubt whether the Poisons do induce
this volatile Alkali. I rather suppose
they operate on the Nerves in such a
manner as to induce a sudden Atonia
& w: given Rise to ye Putrefaction of our Fluids.
— I infer this from a Practice which
has of late Obtained in France of
curing Persons of the most dreadful
kinds of Poisons by nothing else
but a free use of the vol: Alkali.
Surely then no vol: Alkali can preexist
in the Blood in these Cases. —

Let us now enquire after the presence of Neutral Salts in our Blood. we shall enquire particularly after each of them. — I imagine few of them are found in the Body. they are most of them the Products of Art, few of them are presented to us by Nature. There is but one of them introduced in such Quantities as to remain in our Blood, except the Muriatic Salt. Dr. Boerhaave supposed this Common Salt was unchanged by the powers of the Oeconomy. But I know no Foundation for this Opinion. I grant it may appear in the Urine, but in very inconsiderable Quantities. the Urine is a

compound Mass abounding wth many Sub-
stances wch Chemistry has not yet ascertain-
ed. Margraff who has made many
Experiments on the Urine, yet never
found any thing like common Salt in
it. he found indeed Other Salts there w^ch^
former Chemists mistook for Common
Salt. Upon the Whole I think we have
no Proofs of the Presence of Common Salt
in the Blood either from its Causes
or Effects. Dr. Gaubius ascribes many
Diseases to it which certainly may be
deduced wth more Propriety from Another Cause.
— Altho' it is taken in inconsidera-
ble Quantities yet Such is ye Power of
the System that it changes it after it is

received into the Body. Some late Experiments in France teach us that Muriatic Salt may be changed into Nitre. in the same manner I suppose the powers of the System are capable of changing common Salt into ~~Nitrous~~ Ammoniacal Salt. — I say further there is no Salt in our Fluids composed of a fixed Alkali, or of any of the four Acids. the Salt then of our Fluids is of a nature peculiar to itself & appears to be of an Ammoniacal kind. this we proof from such a Salt always appearing in the Urine which we are sure formerly flowed in the Blood Vessels of Animals. It has been called the Essential Salt of Urine, but it may be

(a) This Salt is Common to all Animals
Every Vegetable has a Salt likewise
a Salt peculiar to itself.

(b) When these Obstructions happen very
suddenly they may occasion a predominance
of this Salt in the Blood.

the w: equal propriety called the Essential or native Salt of Animal Fluids. (1a) See Dr. Gaubius § 316 who from his accurate Knowledge in Chemistry has pointed out this very Observation. The Predominance therefore of Salts in our Fluids must always be Attributed to an excessive Quantity of this Ammoniacal Salt. This Excess in Quantity may depend upon an Interruption of the Saline Excretions of Urine & Perspiration. but as these alternate so exactly the w: One Another I imagine no very considerable Disease can arise from this Cause alone. (b) we must therefore call in Other Causes to account for it. Dr. Gaubius supposes Acids & Alkalies may

give this Salt an abundance of Ammoniacal Salt, but we shall soon prove that it depends upon a want of Acids, instead of an excess of them, & in those Cases where the Ammoniacal Salt of our Blood abounds, there is no better Remedy for it than the free use of Acids. Putrefaction we know always evolves a Salt of ye Ammoniac kind. Now we know something analagous to Putrefaction is going forward in the Animal Oeconomy. But this Putrefaction always stops at a certain stage in y^e Body & w: is occasioned by fresh Aliment especially Aliment of a Vegetable Nature. The want then of Vegetable Aliment naturally gives Rise to the Generation of

this Ammoniacal Salt. Abstinence like=
=wise produces the same Effect, as also
all Animal substances wch are advanced any
Degree towards Putrefaction. even Ani=
=mal Food itself may tend to further this
Ammoniacal Salt in greater Quantity.

To these Causes of the Superabundance
of the Ammoniacal Salt in the Blood we
may add Saline Matter introduced
into the Body more especially Neutral
Salts which by the powers of the Systemare
changed into an Ammoniacal Salt. When
this Acc^n: the free use of Alkalies may
introduce this Salt into the Body by
forming a Neutral Salt wth the Acid of

the stomach. But the most frequent Cause of this ammoniacal Acrimony in our Blood is the use of common Salt in too great Quantities. from this you will easily see the remote Causes which conspire in bringing on the Scurvy. viz: Obstructed Perspiration want of Vegetable Food, - the Use of Animal Food alone, & the excessive use of Common Salt.

The Presence then of an Ammoniacal Salt in too great Quantity constitutes the proximate Cause of the Scurvy. we may likewise here understand the Phenomena of dissolved & acrid Blood from which has been said, as depending entirely upon

the Presence of Ammoniac Salt in ye Serum of the Blood. the Blood of Scorbutic Patients has been said to be in a putrid State, but it wants many Characters to constitute it such, for it is not produced by Fermentation like all other putrid Mass, nor is the Disease contagious wch it would be was it of a putrid Nature. to this I may add that ye Serum of Scorbutic Patients has been found to be a most powerful Antiseptic. - the slow progress of the Disease & the many Symptoms it is attended with, all show that it is not of a putrid

Nature. I affirm then that the Blood in the Jaundice is not putrid but may have a putrescent Tendency. This State of the Blood has likewise often been called an Alkalescent State, but as I said before we have no proofs of the Presence of an Alkali in any Form in the Blood. This Ammoniac Salt we have been talking off has been mistaken for it. Dr Gambius ascribes many Diseases to the Alkaline State of the Blood See § 311, but they may all be derived from Other Causes. Nor can I allow that the Blood of Jaundice Patients is in a putrescent State from

the Arguments taken from ye Circumstances of Fermentation we before spoke off. the Ammon.^c salt of the Blood resists Putrefaction hence the Reason why Scorbutic Patients are never subject to putrid Fevers.

Contagions operate very differently. most of them produce Fever except the Lues Venerea. all these Contagions are of a putrefactive kind, but very differently modified. Some of them produce a Matter of a peculiar kind such as the Small pox &c Others produce a Matter wch operate chiefly on the Nervous System only, & Others act ~~various~~ in

such a manner as to make it hard to tell ~~as~~ whether they operate on ye Fluids or Solids. But how far does the Putrefaction go in our Fluids? - This Question cannot be resolved from our great Ignorance of ye nature of our Fluids & the Nature of Putrefaction, as well as the Modus Operandi of those Medicines which are supposed to act as Antiseptics. I ought here to condescend upon the Morbid Deviations of each of the Other Fluids of this Body, but as we know so little of their ordinary State in Health, ~~as~~ well as of the Nature of Secretion to say any thing ~~as~~ precise upon this Subject. Dr. Gaubius has

fallen into Errors in treating upon the Diseases of particular Fluids w: most of you may easily detect. Thus have I concluded the Pathology of the Fluids considered by themselves.

Relative Diseases of the Blood.

We shall now go on to consider the Relative Diseases of ye Fluids.

The Fluids err in Quantity, place & motion.

1st: Quantity we shall consider, their Quantity as^l relative to the solids & 2nd as to to the Arteries wch contain them.

– I shall consider the last only as the first has been hinted at before: the vessels containing Blood are always full & stretched, hence Blood vessels are larger in the living than in the dead Body.

– The Blood vessels are flexible & therefore may be more or less stretched.

If the vessels yield too much an over-
quantity of Blood is produced wh gives
Rise to a Disease called a Plethora.
— the Reverse of this has been called
by Lieutaud Anemia.
The Plethora has been much studied
& many Terms applied to it. a greater
quantity of Fluids than is necessary to
give a proper Tension to ye System is called
by Sauvages "Plethora ad molem", but I
think wh little propriety, — when it prevails
so much as to prevent the Functions being
performed wh their usual Ease it is called
by the Ancients "Plethora ad vires", but
we shall take no notice of this as it is

only a higher Degree of "Plethora ad vasa".

But Dr Gaubius makes another Plethora called "Plethora ad bolumen" wch is when the Quantity of the Blood is not encreased but when their bolumen is encreased either by ye expansive Force of Heat, or by External pressure being taken off. This is sufficiently evinced from a great number of Experimts made in an exausted Receiver. But this Plethora must always be temporary & can never give a permanent Disease.

Another Species of Plethora has been marked in wch the Quantity & bolume of the Fluids continue the same but ye Capacity of the Blood bessels is diminished. This is called "Plethora ad Spatium" - This cannot

act universally in the System, so y^t: ye Effects of this species of Plethora will only appear in particular portions of the System - the Plethora w^ch: follows amputated Limbs may be reduced to the "Plethora ad Spatium"

We shall begin by considering the Plethora ad basa or Plethora vera wch is an increased Quantity of Blood w^th: Regard to the Sanguiferous System. We are daily taking in $\frac{1}{24}$ of the weight of ~~the entire~~ our Body in Aliment. now if this was not immediately thrown out the Quantity of Fluids would soon be increased as to induce violent Diseases, but there is generally a due Ballance kept up between the Ingesta

(as There must be an Increase of y^e power of the Heart wth Regard to ye Resistances, & as the Blood is not absolutely confined, but allow the Blood to pass off further there must be a kind of Ballance between the Expentories. veins. Small arteries & the Great vessels and Heart. If a ready passage was allowed into the veins the Arterious System w^d never be dilated & expanded. we have many proofs of the Density of the veins being Greater in the Begin^g of Life than that of the Arteries, & the Resistance of the Arteries has also the same Effect. It is easy to see that these are greatest at

& Excreta, if this is destroyed a Plethora will naturally succeed. The System itself is at particular times disposed to this inequality between the Ingesta & Excreta. I formerly explained that an accumulation of Fluids was necessary to the Growth of the Body. This accumulation happens only in ye Arterious System. The Sanguiferous System acts upon & is acted upon. as before the Body arrives at its Acme all Plethoras are Arterious sometime after that period they become venous. Unless this preternatural accumulation takes place in the Veins Obesity follows hence the Reason why people grow fat most in middle age. The Balance of the System will vary in at Acme

first, & that the Balance will be con=
=stantly changing as the parts are stretched
& the Dilation will always be in those
parts of the Arterious System wch are most
distant from the Heart as being weaker,
otherwise the Force of the Heart & large
Arteries would constantly need to increase
in proportion. So long as ye Difference
is considerable the Irregularities have big
Effects, but at the same time is a kind of
Plethora ad Inflationem, & the Effect of the
Ingesta must depend all along on the
Ballance of the Veins & Reaction of the
~~Arts~~ Excretories. As the Excretories
are first opened we may suppose they require
resisting Force, & so we find ~~they~~ do. &c.

2nd Manhood which is about 36 3rd an intermediate state from 36 to 50 during which time Menstruation ceases in women. 4th From 50 upwards.

The Occasional Causes of Plethora then are 1st a larger proportion of Aliment joined with stronger Chylopoetic Organs than excretory Depuls.

2nd Aliment will always induce Plethora as it is more nourishing & less perspirable

3rd Aliment the being given Plethora will depend upon Exercise, for the less of this is used the less the Excretories are & greater the Accumulation.

4th Cold which may act in producing Plethora

by diminishing the Secretions especially Perspiration. These then are the most commonly marked Causes of Plethora but we must add to them.

5.th Evacuations. How do these operate so as to induce a Plethora? — The Evacuation I refer to here is Artificial Blood-letting. — Nothing we know disposes more to the Plethoric State than this. Small Bloodletting does not produce Plethora so much as copious Blood Letting from the Disposition of the Solids to contract themselves. But Dr Gaubius has pushed this Method of Reasoning too far. If we take a String of 10 Inches long, & stretch it one Inch more by a weight appended for several days, this String will not contract

it all to its former Length, at least for a considerable time, thus it is w.y. Fibres of our bodies. if the stretching Powers are taken off gradually from the solids they soon accommodate themselves to the Fluids, but if the Tension is suddenly taken off it is impossible for them to contract. hence a Laxity is induced. ~~to~~ in Consequence then of Blood-Letting the Sensibility of ye Arteries is encreased while the Secretions continue the time, by this means a Plethora is induced. It is owing to this that y^e Loss of Blood is so soon repaired by y^e System. — The Secretions by means of Blood-Letting require an encreased Contraction which tends still further to produce the plethoric State. By w^h Marks do we judge of the

Plethoric State? by an apparent Plumpness & Fulness of the Body. But this is ambi=
=gious as it may depend upon Fluids accu=
=mulated in the Cellular Texture, hence
Obesity & Plethora are often confounded
especially as they are always more or less
connected wth each Other & depend upon
the same Occasional Causes. Obesity itself
may encrease Plethora especially that species
of it w^ich we called "Plethora ad spatium".
I find it therefore very difficult to distinguish
between Obesity & Plethora. we are apt to
think Oily Aliment conduces towards Obe=
=sity but we have few or no proofs of this.
many fat People live but little ~~on~~ on Oily
Substances & many lean People live

on an oily aliment alone. Do not assimilating powers prevent the evolution of these oily parts of our aliment? - or may not the organs which secrete this oily matter be more or less disposed to evolve it? But we know so little of this subject that we can say but little certain upon it. I formerly said <u>liquids</u> tend to mix ~~to~~ the oil & water of our aliment. May not an over proportion of this liquid prevent the evolution of this oil. It may not an over proportion of animal food tend to produce obesity by evolving ~~an~~ by its greater tendency to putrefaction oily as well as saline matters. I deliver these things merely as conjectures.

But we shall seek for Other Causes of Obesity or the Absence of it. Exercise we know prevents Obesity either by preventing the Evolution of Oil, or absorbing it as soon as it is evolved. The first is most probable, as we find Exercise tends to encrease the Excretions wch prevent Fatness. Excretions tend to prevent Obesity hence Nurses & Milch Cows can never be fattened while they give Suck. Other Evacuations as well as this operate in the same way. I have seen Obesity follow a Fever being healed upon. There is then a Ballance be the increased secretion of Oil & the Excretion

it, hence then you see the Reason why Obesity & Plethora are connected with One another as they evidently depend upon the same Causes. but this is not enough on this subject. we often see lean meagre Persons grow plump & fat between 30 & 40. at this Period the Arterial Plethora is taken off. It must then arise from the Ballance of the Secretions & Venous System being destroyed. It appears then that the Disposition to Obesity as well as to Plethora depend upon the same ~~com~~ State of the System. we may therefore take Measures to remove Obesity as well as Plethora, but it sh^d be attempted very cautiously. I have know Ladies throw

up their Dinner every day - purge them=
=selves & drink vinegar to bring down
their Fatt, but in all these Cases it bro't
on many Diseases. the Circumstances
of Exercise then are only to be depended
on in taking down Obesity, but this
should be used w:th the utmost Caution.
Vinegar & Soap have been used w:th
success to remove Obesity: But these
surely operate in a very contrary Man=
=ner the One cures & the Other de=
=stroys the bird of the System. how shall
we reconcile this w:th what we said
before?

Let us enquire into the contrary Relative Diseases of the blood.

1st Inopia Sanguinis, or a simple want of blood in the blood vessels. This may depend 1st upon immoderate Evacuations 2nd: a want of aliment. - a diminished state of the Excretions generally follows a want of aliment, ~~but~~ & therefore the balance wd: still be kept up between the Fluids & Solids. by a want of aliment then I mean an Abstraction of it either by a vomit - or Dyarrhœa or Obstructed Lacteals after it is taken in. 3d: upon imperfect Assimilation. or Blood of such a Nature as to pass off at once by urine or Perspiration. I shall point

But one Case of want of Assimilation in wch Case there is a want of red Globules wch we know from ye Paleness of ye Surface of the Body as well as Other Phenomena, especially by the Secretions being increased i.e. by the Fluids running off by every Emunctory. Dissections have likewise pointed out this state of the System. Lieut.d in particular takes Notice of it under the Title of Anemia. What are ye Causes of this 1st The want of that Aliment wch constitutes the red Globules. 2nd The Defect of those Powers in the System wch form the red Globules 3rd Evacuations ~~from~~ of Red Blood. These two last Causes seem chiefly to Operate in inducing Anemia. I dont know wn to say to the want of Aliment, or to ye nature of it.

Anemia

the Bull & the Lion have an Equal Quantity of Red Globules in their Blood, as also the Peasant who lives on Oatmeal, and the rich Citizen who lives only on Animal Food. the powers of Assimilation then I suspect are chiefly defective & the principal Cause of a Deficiency of Blood. hence we find the Chlorosis always succeeds a weakness of the Chylopoetic Organs. the Consequences of this Anemia are a want of Tension which induces a general Debility in the System. And if we admit the use we formerly assigned to the Red Globules viz to retain the more fluid parts of the Blood, the want of Red Globules will naturally

tend to suffer the more fluid parts of the Blood to escape thro' the numerous patent Vessels wch abound all over the System. to prevent this Disease I believe the Red Glo=:bules are always in a very large proportion in growing Animals. When they are dimi:nished the Fluids run off thro' every Emunctory either internally or externally producing ser=:ous Discharges or Dropsies - hence the Rea=:son why Dropsies so often succeed Ha=:morrhages. How far may the want of Coagulable Lymph tend to bring on this Anaemia? This Subject I formerly said was Deeply involved in Obscurity, & I shall therefore pass it over. I shall only

Observe that this Anæmia always tends to bring on a want of Tension & Debility in the System more especially of the Stomach & Chylopoetic Organs. It ap:pears likewise in the Brain. hence Lein:hard & Morgagni tell us that they al:ways found the Inopia Sanguinis prevail most in the Brain, & instead of Blood they generally found Air in ye Blood-ves:sels w: detachtes itself from ye Ordinary Posture it was used to, being taken off. This want of Tension in the Brain disposes greatly to Lycope. Deliquium Animi &c.

I go on to speak of the Causes of Emaciation. this may depend 1st upon a want of Aliment & 2nd upon too great Secretions. in general I think it depends upon an Absorption of that ~~the~~ matter which occasions Fatness or Obesity which may be occasioned by an Acrimony introduced into the System.
2nd upon too great Muscular Motion
3rd Force and Circulation of the Fluids &
4th too great Secretion of some of the Fluids of the Body especially Milk or Bile. I deliver these things as simple Facts, nor do I think they stand in need of any Proofs. —

We come now to speak of the Motus vitia. The Motion of our Fluids is intestine and propepive. As to ye first viz Intestine we are sure it take place both Mechanic & Chemical. The Mechanical depends upon external Impulse. The Chemical upon the Action of ye Fluids upon One another. The Mechanic Motion never changes the Chemical Qualities of the Fluids, nor has it any Effect only as it influences the Chemical Motion of the Fluids. The Chemical Motion may depend either on Mixture or Fermentation. in both

Cases it consists in Resolution & Combination in w: Manner these Operate we cannot tell. All we can say is y: there are such powers in our System but we are entirely ignorant of their modus Operandi. See Dr Gaubius §407 upon this subject. The Action of the Solids I grant governs the Mixture of the Fluids but there are Operations in them w: are quite independant of the mechan: Action of the System.

What is the Progressive Motion of our Fluids? It generally depends upon the Action of the Solids w: are capable of

being excited by various powers acting directly or indirectly upon them. These exciting powers are mostly Stimuli, or Sedatives wh: last sometimes indeed excite the Action of the Solids. this must depend upon their acting in such a manner on the Sensorium so as to produce a Reaction of it upon the System & thus excite all the moving powers of the System. Tis however the first kind of Stimulus that most of Pathologists refer to I mean such as act Directly upon the moving powers. - Notwithstanding this the great progressive Motion of our Fluids depends

upon Stimuli that act Indirectly upon the System viz Fever. Dr Boerhaave in § 586 of his Aphorisms imagins Fever depends upon direct Stimuli. But in this he is certainly wrong which I could prove at some length was this a convenient place. Upon I reduce the Causes of Fever to 4. 1 Cold, 2 Fear, 3 Contagion & 4 a Resistance in the Sanguiferous System. all these weaken the Action of the Heart, in such a Manner as to excite the Reaction of the Sensorium to overcome the Resistance induced by the Causes aforesaid.

On what does a slower Motion of the

Fluids depend? on a diminished
Action of the Solids alone, not depending
on Obstruction for I do not think this
can occasion a slower Motion of the
Fluids, much less do I imagine a
Lentor or viscidity of the Fluids is capable
of producing such Effects.

on what does an increased Motion
of the Fluids in particular parts of y^e Body
depend? 1st upon an Inequality of y^e
Blood's Distribution from the greater Vicinity
or Distance of parts from the Heart
or from their more Oblique or direct
situation. 'tis upon this Reason

Epilepsy &c 348 &c

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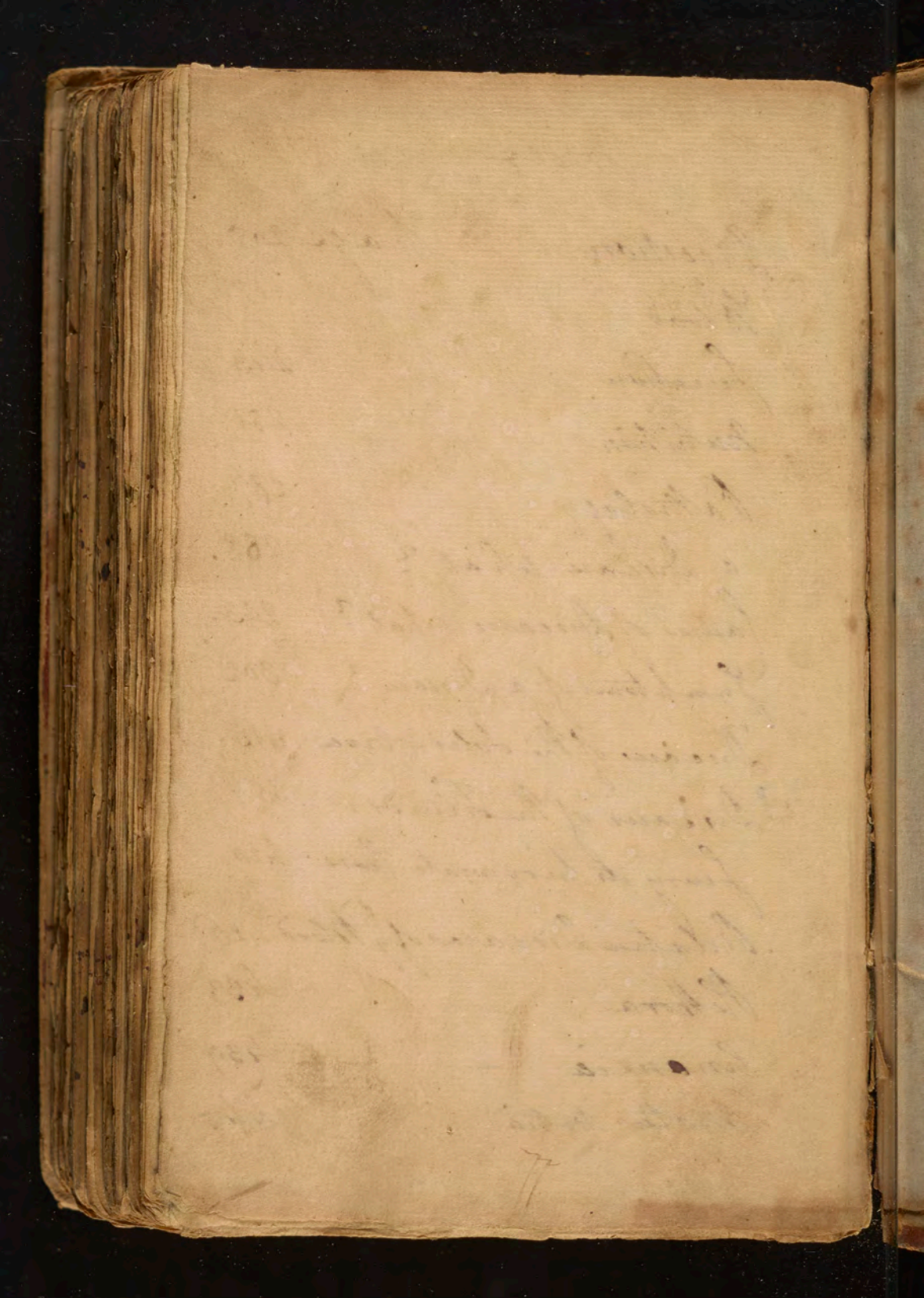

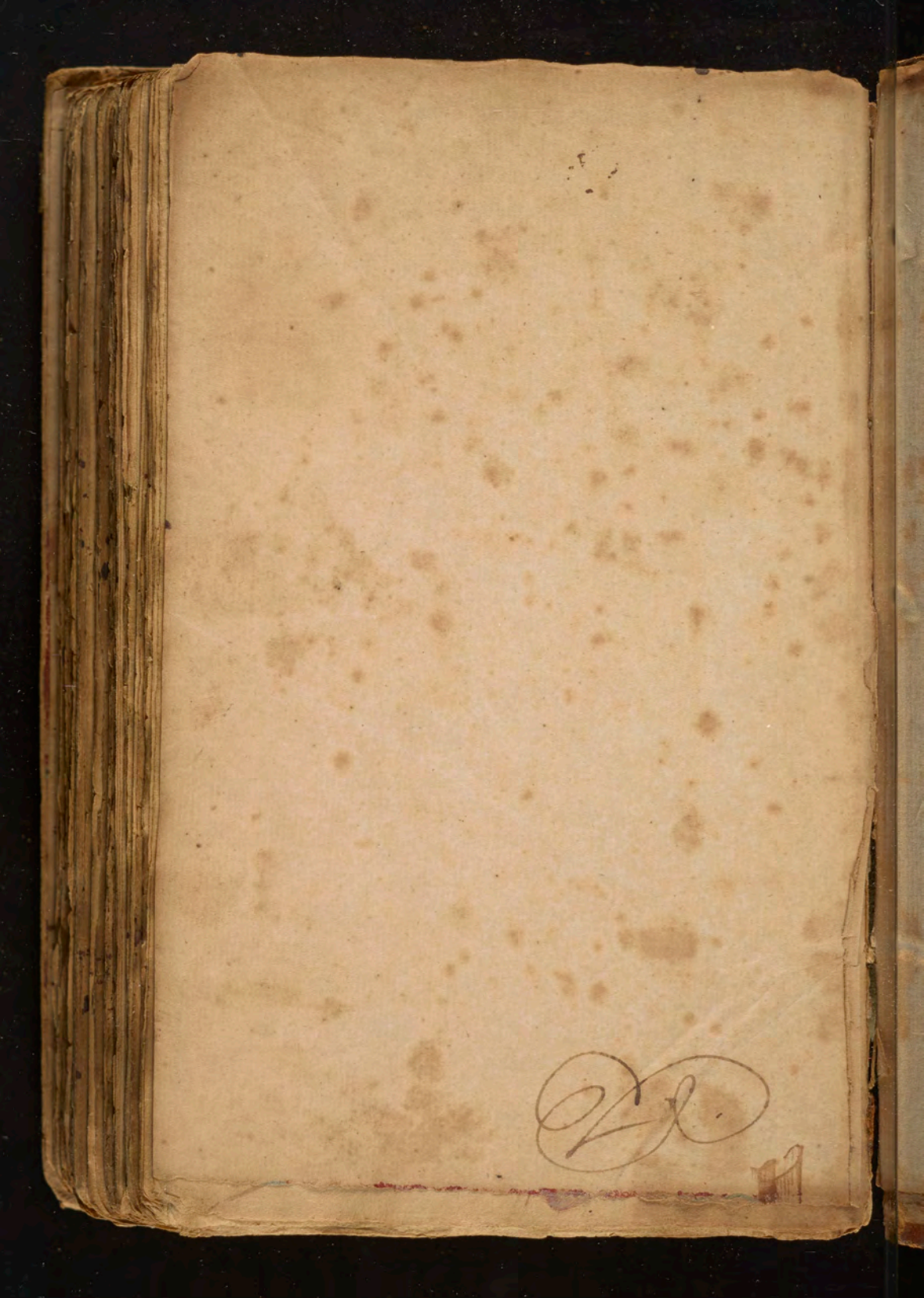

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